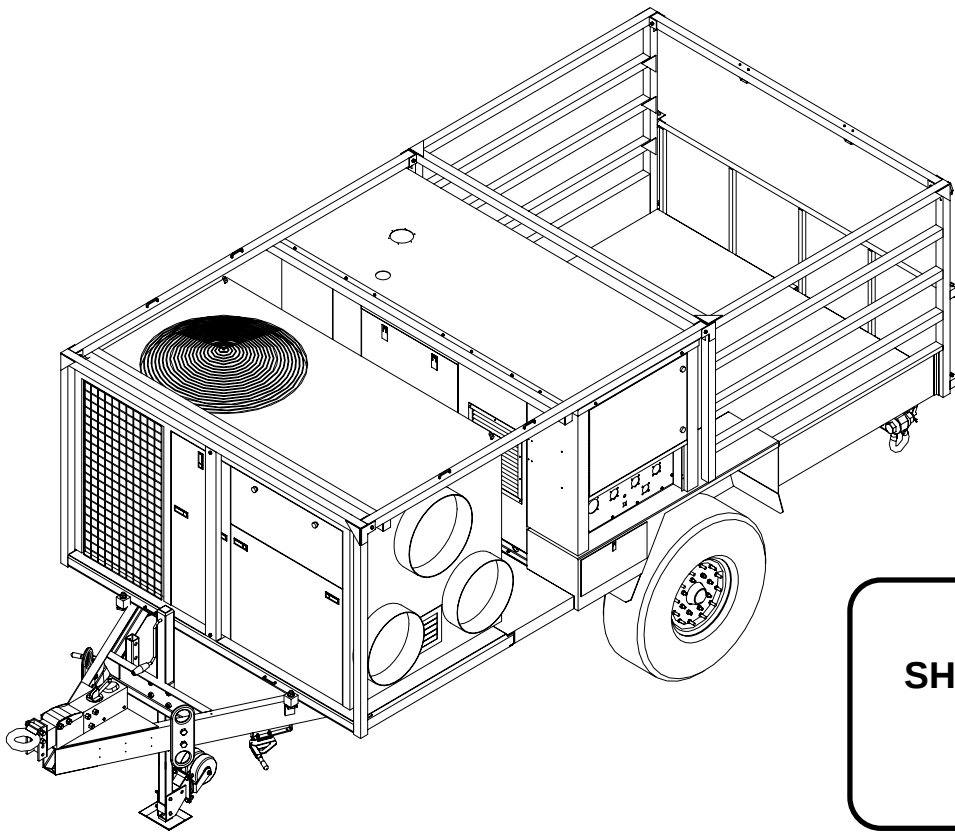




UST TRAILER MODEL HP-4DL OPERATIONS & MAINTENANCE MANUAL



THIS MANUAL IS
SHIPPED WITH TRAILER
VIN#

23-8994A-005



ISO 9001: 2000 Registered
Quality Management System

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DHS PART NUMBER: 83008

DHS MANUAL PART NUMBER: 95151-00

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Revision History

Date	Revision	Description
05/17/04	T2-95012-00	Original Issue.

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WARNING SUMMARY

This Warning Summary explains the use of general safety Note, Caution, and Warning notices present in this Technical Manual that must be understood and applied during the operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel.

Equipment Specific Safety Issues

General

The cautions and warnings point out known conditions that are potentially hazardous. However, no manual can cover every possible situation. If in doubt, contact DHS ().

Before calling DHS for assistance, please identify the trailer by its DHS VIN (Vehicle Identification Number). The DHS VIN is on the trailer nameplate on the front of the trailer by the tow ring.

Service and repair procedures not covered in this manual should be performed only by authorized DHS technicians.

General Precautions

REMEMBER SAFETY FIRST. If unsure of the instructions or proper operating procedures, contact DHS before continuing.

This manual emphasizes the safety precautions necessary during the operation and maintenance of the HP-4DL. Each section uses caution and warning messages for both the safety of the operator as well as the durability of the equipment. If any of the cautions or warnings is not readily understood, contact DHS before proceeding.

When an abnormal condition is observed and procedures in the manual do not specifically describe the condition, all operations should be stopped and DHS Systems should be immediately contacted for assistance.

DHS SYSTEMS LLC Contact Information

Phone: 800-977-3647

FAX: 845-365-2114

e-mail: drash@drash.com

Qualified Personnel

A qualified person is one who is familiar with this manual, the operation of the HP-4DL and the hazards involved in its operation and maintenance and who has been certified by the DHS SYSTEMS LLC Training program.

This manual is not intended to be a substitute for proper training. DHS SYSTEMS LLC strongly recommends that operators receive training directly from DHS SYSTEMS LLC.

Trailer Chassis

The Trailer Chassis requires the following routine safety precautions:

- Walk around the trailer. Inspect for leaking fluids, fumes, and flat tires.
 - Check the fire extinguisher for adequate charge and current inspection date.
 - The Trailer for every HP-4DL has two hand-operated parking brakes, one for each wheel (see Figures 2-1 and 2-2 in Chapter 2). Verify that each wheel's hand-operated parking brake is in the proper position for towing or stationary operation.
 - Examine the front of the trailer when the trailer is attached to a tow vehicle, verify that the coupling is secure, the safety chains are in place, and the breakaway chain in place. The breakaway chain is connected to the breakaway lever. The lever must be pointing to the rear of the trailer (see Figure 2-10 in Chapter 2). Accidental application of the lever will cause the trailer brakes to drag, heat up, and possibly burn out.
 - When the trailer is supported by the dolly wheel / skid plate assembly, verify that the tongue jack is upright and stable and all the pins are securely in place.
-

Warning Boxes

Warning Box Words & Icons

Warning Boxes are provided throughout this Technical Manual and are used to call attention to various details about either the equipment that are important enough to separate from the normal operating descriptions and/or procedures or a safety-related situation that the operator must be aware of. The appearance of the basic Warning Box is shown in Figure a. There are generally four information points provided by each Warning Box that follow a defined pattern. Figure a defines the positions of the information points.

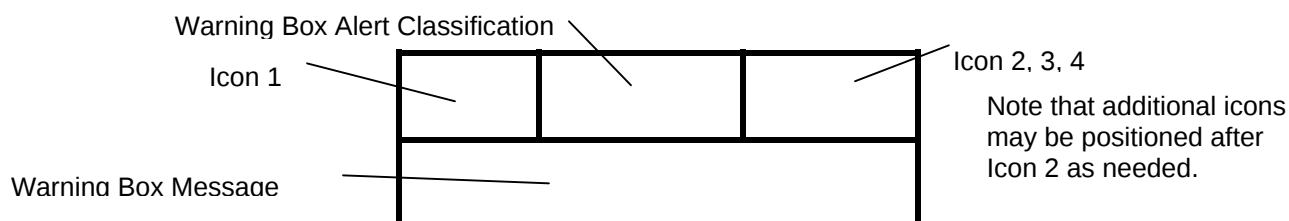


Figure a - Warning Box Definition

Icon 1:

Icon 1 is the primary indication of the contents of the Warning Box. The Icon is meant to visually alert the reader to the level of importance of the Warning.

Icons 2, 3, 4:

The icons that appear to the right of the Warning Box Classification provide a secondary indication of the contents of the Information Box. The position is labeled Icon 2, 3, 4 in Figure a (above) because there may be multiple types of alerts associated with the warning. The types of Icons found in Icon Box 2 are as follows:

When Icon 2 is the same as Icon 1, it means that there is no further specific information about the type of Alert.

If Icon 2 is different than the icon shown in Icon Box 1, it means that there is more specific information available about the type of Alert. An example of an Warning Box where there would be two different Icons shown in Icon Box 1 and Icon Box 2 would be that of a burn hazard. In this case, Icon Box 1 will show an Icon representing a burn hazard. If the burn hazard was created by a particular substance such as gasoline, Icon Box 2 would be an Icon indicating a Flammable Fluid.

In certain instances, additional icons will appear after Icon #2. These icons will either enhance the definition of the warning or they will indicate the presence of additional hazards that may exist either because of the original condition or in addition to the original condition.

Warning Box Alert Classifications

The Warning Box Alert Classification is an indication of the level of importance of the Warning Box. The various levels of Alert Types are defined below, from the most important (Danger) to items of lesser importance.

Danger: Danger refers to immediate hazards that will result in severe personal injury or death.

Warning: Warning refers to a hazard or unsafe method or practice that may result in severe personal injury or death.

Caution: Caution refers to a hazard or unsafe method or practice that may result in personal injury or equipment damage.

Note: Note refers to an important feature that the operator should be aware of for maximum operating efficiency of the equipment.

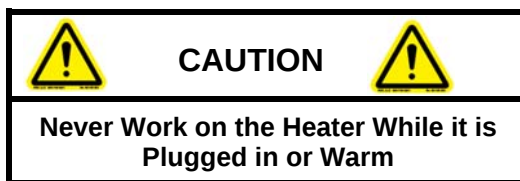


Figure b - Example of a Generic Warning

Common Warning Symbols Definitions

The following symbols are commonly used to indicate that a task requires precautionary measures be understood and practiced during the execution of the task.

Icon	Definition	Notes
	CAUTION The exclamation point is intended to alert the user to the presence of important operating and/or maintenance (servicing) information in the literature accompanying the product.	
	PRESENCE OF ELECTRICITY The lightning bolt is intended to alert the user to the presence of electricity. The electricity can be directly related to the specific operation or it can be in the area of the operation.	This icon is typically used with another, more specific, icon that identifies the nature of the warning.
	HAZARDOUS VOLTAGE The lightning bolt and human figure is intended to alert the user to the presence of voltages that can serious or fatal shock to a person.	
	EXPLOSION The explosion is intended to alert the user to the possibility that something associated with or in the area of the particular operation presents the risk of an explosion.	This icon is typically used with another, more specific, icon that identifies the nature of the warning.
	EXPLOSION The explosion with a face is intended to alert the user that a particular operation or task exposes the individual(s) to a risk of explosion within close proximity to the immediate work location.	This icon is more specific than the previous EXPLOSION icon.
	HOT SURFACE The open flame and heat lines is a generic icon to alert the user that there is or could be an exposed source of flame in the immediate vicinity of the particular operation.	This icon is not the same as the FLAMMABLE icon described below.
	HOT SURFACE w/BURN HAZARD The radiating surface with a hand alerts the user to the risk that there is or could be a potential for being burned by contact with a surface.	Hot surfaces are not always associated with a flame. An engine exhaust pipe is one example of a hot surface with no flame.
	FLAMMABLE The large open flame indicates that the associated operation involves working with fluids and/or gases that are flammable.	Burning gases and liquids can cause severe burns. Keep ignition sources away.

Icon	Definition	Notes
	LIFTING HAZARD The image of a person lifting a box indicates that the object in question is particularly heavy and presents a risk of back injury if not lifted properly or with assistance.	Other warnings that use this same icon include: HEAVY OBJECT TWO-PERSON LIFT MULTI PERSON LIFT
	HAND ENTANGLEMENT The image of a hand being trapped between two rollers indicates that there is a risk of a hand being trapped and possibly injured by one or more pieces of moving machinery.	
	PINCH POINT The image of a hand being crushed between two objects indicates that the particular piece of equipment or the particular operation presents the possibility that a hand or other part of the body can be pinched during the task.	
	STOP The uplifted hand within a red circle indicates that the person should stop and identify all possible risks and hazards associated with the particular operation before proceeding. Failure to observe this warning can lead to serious problems and the risk of injury or death.	Other warnings that use this same icon include: STAY CLEAR
	HAZARDOUS GASSES The image of a person inhaling gasses is intended to alert the user to the possible presence or release of gasses in the immediate area that can be harmful if inhaled.	
	FIRE EXTINGUISHER The image of a fire extinguisher indicates that the person should have an extinguisher ready or be aware of the location of the nearest fire extinguisher during a particular operation or task.	
	FIRST AID The cross in a circle is the international standard icon for a first aid kit. When used within an Operation & Maintenance Technical Manual, the First Aid icon indicates that the person should be aware of the location of such a kit.	

HOW TO USE THIS MANUAL

Work Package Description

This Technical Manual and the procedures within it are organized according to the Work Package numbering format identified in DoD Standard Practice for Preparation of Technical Information for Technical Manuals (MIL-STD-40051A) and DoD Guide to the General Style Format of US Army Work Package Technical Manuals (MIL-HDBK-1222B(TM)).

Work Package Numbering

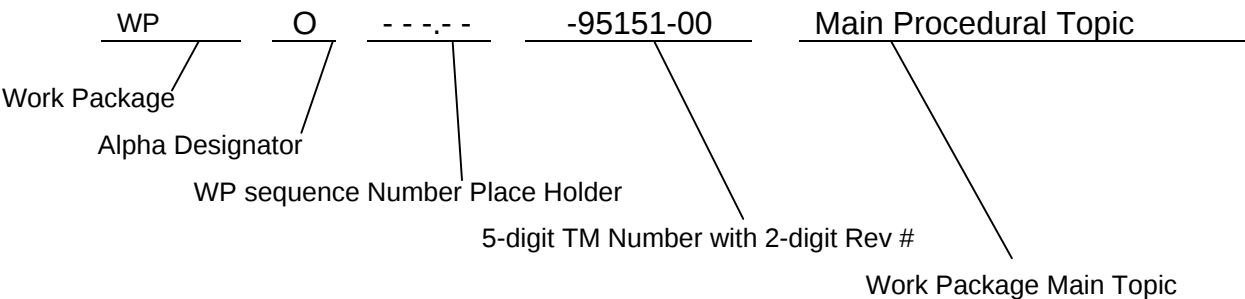
The Work Package numbering and lettering sequence is derived from MIL-STD-40051, page 25, and is explained here for reference.

The following alpha designators describe the specific types of information within this Technical Manual and within the specific Work Packages.

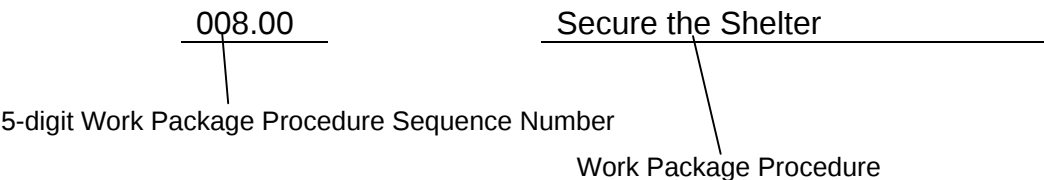
Alpha Designator	Description		Alpha Designator	Description
G	Descriptive information and theory of operation		R	Repair parts and Special Tools List (RPSTL)
I	Inspection Procedures		S	Supporting Information
M	Maintenance Procedures		T	Troubleshooting Procedures
O	Operation Procedures			

This manual uses two methods to present the Work Package numbering sequence:

The first method identifies the Parent Work Package by Alpha Designator, 5-digit Technical Manual number with revision number, and Work Package Main Topic. The Work Package Main Topic identifies the general scope of the Work Package Procedures to follow. An example Parent Work Package number is defined below.



The second numbering method identifies the titles of specific procedures by Work Package Sequence Number and Work Package Procedure. The Work Package Procedure Sequence Numbers will always flow from a lower number to a higher number, indicating the progress towards completing the Main Topic Procedure. An example of a specific Work Package Procedure is defined below.



Note that the first three digits of the Work Package Sequence Number will never change for the life of the product. The last two digits of the Work Package Sequence Number and the last two digits of the Technical Manual Number are revision numbers and will change from time to time as revisions to either the product or the Work Package occur.

In all instances, the last two digits of the Work Package Sequence Number and the last two digits of the Technical Manual Number must always match. An examination of the Table of Contents page will show how the two numbering systems integrate.

All Work Packages will end with “ **END OF WORK PACKAGE** ” statement in bold type. The next Work Package will then begin and be identified by a Parent Work Package title described above.

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1. SCOPE

This Operator's Manual describes the safe operation and field maintenance of the DRASH Utilities Shelter Transporter (UST) Trailer Model HP-4DL.

1.1 Equipment Description

The trailer consists of one 35 kW, 120/208 Volt, 3-Phase, 60 Hz, Diesel engine Genset and one 144,000 BTU/hour Environmental Control Unit (ECU) mounted on a trailer chassis. Up to three rapidly deployable DRASH shelters and shelter accessories are added as cargo. A vehicle capable of pulling 6000 lbs. can tow the trailer. The trailer meets the noise requirements for Tactically Quiet Generators. The trailer has an overall length of 231 inches, an overall width of 85 inches and an overall height of 77-1/2 inches.

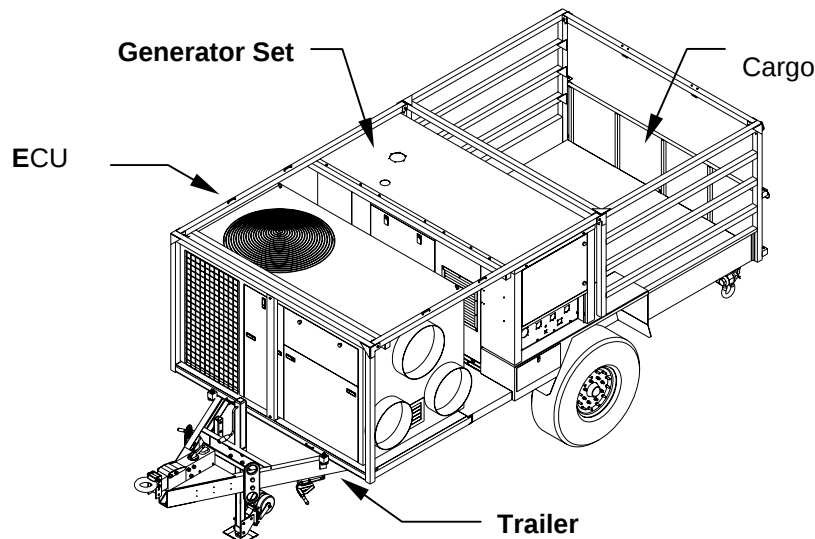


Figure 1-1 - DRASH UST Trailer Model HP-4DL

WP G --- -- -95151-00 Major Components

001.00 Trailer Chassis

The trailer chassis consists of a six-inch structural steel channel frame with four tie-down rings and an aluminum upper structure. The trailer chassis is equipped with a hydraulic surge brake system, two hand-operated parking brakes, two run-flat bias-ply tires and an in-chassis, 25-gallon, baffled fuel tank, fitted with a four-inch diameter filler and a fuel level indicator.

Two 24 VDC tail light assemblies are connected via a cable to a 12-pin plug for connecting to the towing vehicle receptacle. An adjustable tongue jack is provided to raise and lower the tow ring (lunette) to pintle height. The jack is also used to level the trailer during storage or operation. A storage post for attaching the dolly wheel / skid plate assembly during towing is provided. There is one storage compartment for tools and auxiliary equipment. Some units may have a saddlebag in place of a storage compartment.

002.00 Genset

The 35 kW Generator Set consists of a four cylinder, liquid-cooled, 1800 RPM, turbocharged Diesel engine coupled to a single bearing, four-pole generator.

The engine's fuel is supplied from the in-chassis fuel tank or from an auxiliary source. The Genset powers the ECU as well as shelter lighting and utility outlets. The trailer can also be connected to, and operated using, an external Shore Power source.

The Genset is housed in a weatherproof, acoustically insulated, aluminum enclosure. The enclosure also contains the Genset Instrument Panel, Genset Control Panel, Genset Power Distribution Panel, and two 12 VDC, non-spillable, maintenance-free batteries suitable for 24 VDC engine starting.

003.00 Environmental Control Unit

The ECU provides 144,000 BTU/hour (12 tons) of cooling at 120 °F (ambient air temperature) or 25 kW of electrical heating. The ECU is designed to provide heating or cooling of the enclosed space created by deployed shelters over the ambient temperature range of 25 °F to 120 °F.

The ECU is housed in a weatherproof, aluminum enclosure. A thermostatic control that monitors return airflow is used to set and regulate temperatures. A selector switch determines the mode of operation. Airflow is directed to the shelter(s) by way of two 12-inch diameter insulated supply air ducts. Optional plenums can be attached to the interior of the shelter(s) to provide for air distribution and circulation. Air is returned to the ECU via two 12-inch diameter insulated return air ducts.

004.00 Auxiliary Equipment:

The trailer electrical set consists of one 50', 120V, 20A trailer lead; two 30', 120V, 20A trailer leads; a 5' battery charger cable and a 5', 60A shore power cord (with pigtail on one end) provided in a canvas bag.

A set of auxiliary fuel lines for fueling from an alternative fuel source is kept in the storage compartment. The supply line and the return line are both eight feet long. A funnel for adding fuel, oil or coolant is also provided.

Mounted on the trailer is a three-section, 5/8" diameter grounding rod with drive stud and two bronze couplings. One 15' #6 AWG ground wire, suitably terminated for grounding the trailer, and one four-pound sledge hammer, for driving the ground rod into the earth, are kept in the storage compartment.

One five-pound ABC dry chemical fire extinguisher is mounted on the trailer.

A waterproof and mildew-resistant tarp protects the trailer during transportation or storage. Tarp tie-downs are provided.

The four ECU ducts, in individual canvas bags, are stowed on the trailer.

005.00 Shelter

Three DRASH shelters and its accessories can be transported on the trailer. The shelter transport bag contains the shelter, floor, ground cover, push poles and repair kit. Shelter accessories can be installed on the trailer in their labeled canvas bags. For detailed information regarding DRASH shelters, refer to the Operators' Manual provided with each shelter or contact DHS (phone: 800-977-3647, fax: 845-365-2114 or e-mail: drash@drash.com).

END OF WORK PACKAGE

WP G ---,--- -95151-00 Specifications

006.00 General

Color: OD Green or Desert Tan

Paint: CARC Mil-C-46168

Overall Dimensions:

Length: 231 in (5.87 m)

Width: 85 in (2.16 m)

Height: 77.5 in (1.97 m)

Wheel Track: 72 in (1.83 m)

Ground Clearance:

Unloaded: 18 in (0.46 m)

Loaded: 16 in (0.41 m)

Tow Ring (Lunette) Nominal Height: 28 in (0.71 m)

Weights:

Tare: 1,620 lb (764 kg)

Utilities: 1,930 lb (904 kg)

DRASH: 2,260 lb (1053 kg)

Gross: 6,000 lb (2721 kg)

Tongue (loaded with cargo): 387 lb (176 kg)

Tongue (with no cargo): 536 lb (243 kg)

Cargo Area:

Height: 47 in (1.19 m)

Length: 71 in (0.83 m)

Width: 81 in (2.06 m)

Capacity: 156 CF (4.5 m³)

Noise Level (at 3 feet from the control panel):

With the ECU off: 68.2 dBA

With the ECU on: 75.9 dBA

007.00 Trailer Chassis

Construction: Steel and Aluminum

Electrical System: 24 Volt

Brakes:

1. Hydraulic surge brake system with automatic breakaway actuator.
2. Two independent, lever-operated mechanical parking brakes.

Axle and Suspension: Single axle with Torflex suspension rated at 6000 lb

Tires: Two 37 x 12.50 x 16.5 LT *Goodyear Wrangler R/T II*, Load Rating C bias ply, run-flat tires.

Fuel Tank: 25-gallon baffled fuel tank.

008.00 Genset

Engine: Four-cylinder, liquid-cooled, direct injection, 1800 RPM, turbocharged Diesel

Fuel Type: Diesel, JP5 or JP8

Consumption: 1.25 gal/hr @ full load

Battery Capacity: 24 VDC

Generator: Four-pole, single bearing generator rated for 35 kW at 125 °F providing 120/208 VAC, 60 Hz, 3 phase power

Power Distribution Panel:

- (3) - 120 VAC, 20 A, 1 phase receptacle
- (1) - 120/208 VAC, 60 A, 3 phase shore power receptacle
- (1) - 120 VAC, 4 A, battery charger receptacle
- (1) - 24 VDC NATO/slave receptacle

009.00 Environmental Control Unit

Cooling output: 144,000 BTU/hr at 120 °F

Heating output: 25 kW

Air Flow: 4300 CFM

Modes: Off, Fan, Cool, Heat

Ducts: single 18" diameter supply, double 16" return

Refrigerant: R-407C or R-22, indicated on ECU control box cover.

Features: Hot gas bypass, stagger start, and phase indicator light.

Maximum power draw: 26 kW

END OF WORK PACKAGE

WP O --- . -- -95151-00 Equipment Safety

010.00 Trailer Chassis

The following safety precautions should be observed by walking around the trailer.

1. Inspect for leaking fluids, fumes, and flat tires.
2. Verify that the spare tire is securely bolted to the trailer.
3. Verify that the fire extinguisher for adequate charge and current inspection date.
4. Each wheel's hand-operated parking brake should be in the proper position (see Figure 2-2 and Figure 2-3, page 2-2).

Examine the front of the trailer. When the trailer is hooked up to a vehicle,

1. Verify that the coupling is secure, with the safety chains in place and the breakaway chain in place.
2. The breakaway chain is connected to the breakaway lever. The lever must be pointing to the rear of the trailer (see Figure 2-10, page 2-4). Accidental application of the lever will cause the brakes to drag, heat up, and possibly burn out.

When the trailer is supported by the dolly wheel / skid plate assembly,

1. Verify that the tongue jack is upright and stable and all the pins are securely in place.

011.00 Genset

The following safety precautions should be observed:

- Remove the entire tarp from the UST Trailer before operating.
- Immediately fix any fuel, coolant, or oil leaks.
- Keep the Genset enclosure clean. There should not be any debris of any kind within the enclosure.
- Check and maintain correct levels of coolant and lubrication oil.
- Do not restrict airflow to and from the engine. Make sure that all of the louvers are clear of all obstructions to allow air to flow freely. There is an additional air intake located on the bottom of the enclosure, underneath the trailer deck. The exhaust is located under the trailer chassis.
- Do not run equipment without all safety guards in position including the access doors to the enclosure.
- Operate the Genset outdoors. Make sure the exhaust is directed away from personnel.
- Do not use ether-based cold start aids.

Before performing any maintenance work:

- Make sure the ground rod is properly connected.
- Turn all circuit breakers to the OFF position.
- Turn all switches, including the Power Selector Switch, to their OFF positions.
- Disconnect the negative (black) lead from one of the batteries.

Whenever the generator is running, always assume and proceed as if voltage is present. Caution must be exercised, or serious personal injury or death can result. Only authorized DHS technicians should perform maintenance or service procedures while the engine and/or generator is running.

Keep one's body and clothing clear of all moving parts.

Whenever solvents, cleaners or flammable liquids are present, adequate ventilation must be available to avoid fire, explosion and health hazards. Always avoid breathing vapors and use suitable protective equipment to prevent personal injuries to the head, eyes, face, feet, hands, etc.

Except for the procedures described in this manual, only authorized DHS technicians should perform service on the Genset. If in doubt, contact DHS.

**WARNING**

Note that the batteries should only be disconnected after all switches and circuit breakers are in the OFF position.

Observe battery voltage and polarity markings. These safety precautions are necessary to prevent serious personal injury or even death.

DHS SYSTEMS LLC Contact Information

24-Hour Hotline: 800-977-3647
FAX: 845-365-2114
e-mail: drash@drash.com

012.00 Environmental Control Unit

The following safety precautions should be observed:

1. Remove the entire tarp from the trailer before operating.

2. Operate the ECU in a properly ventilated area.
3. Keep the ECU enclosure clean. There should not be any debris of any kind within the enclosure.
4. Do not restrict airflow to and from the ECU. Make sure that all of the louvers and the fan are clear of all obstructions to allow air to flow freely.
5. Do not run equipment without all safety guards in position including the access doors to the ECU enclosure.

Before performing any maintenance work:

1. Make sure the ground rod is properly connected.
2. Turn all circuit breakers to the OFF position.
3. Turn all switches, including the Genset Power Selector Switch, and ECU Mode Selector Switch, to their OFF positions.
4. Disconnect the negative (black) lead on one of the batteries.

Keep one's body and clothing clear of all moving parts.

Wear approved personal protective equipment (goggles/face shield) when using compressed air.

Air pressure should be restricted to less than 30 PSI.
Provide protection from flying particles.

Do not direct air stream towards self or other personnel.

Except for the procedures described in this manual, only authorized DHS technicians should perform service procedures on the ECU. If in doubt, contact DHS (phone: 800-977-3647, fax: 845-365-2114 or e-mail: drash@drash.com).

013.00 Refrigerant Emissions



WARNING



The ECU has a closed-loop, pressurized system charged with R-407C or R-22 refrigerant.

DO NOT ATTEMPT TO CHARGE OR TO "TOP OFF" CHARGE.

DO NOT CLOSE, OPEN OR ADJUST VALVES IN THE REFRIGERANT SYSTEM.

Personnel could be injured and/or equipment damage could occur.

DHS SYSTEMS LLC Contact Information

Phone: 800-977-3647

FAX: 845-365-2114

e-mail: drash@drash.com

END OF WORK PACKAGE



NOTICE



The U.S. Clean Air Act amendments of 1990 prohibit venting refrigerants to the atmosphere. The objectives of this program are to reduce the use and emissions of such substances to the lowest achievable level and maximize the recapture and recycling of such substances. In addition, the amendments establish new standards for the safe disposal of these substances.

All emissions must be captured in a suitable container for further recycling or safe disposal.

It is the customer's responsibility to keep abreast of latest amendments to this act.

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2. STORAGE & TRANSPORT

2.1 General Storage & Transport Information

The trailer is designed for outdoor use. No special packaging is required for storage or transport.

	NOTE	
THE PICTURES AND DRAWINGS ON THE FOLLOWING PAGES ARE NOT ALWAYS EXACT REPLICATIONS OF THE TRAILER THIS MANUAL REFERS TO. THESE DRAWINGS AND PICTURES ARE USED TO REFERENCE TRANSPORTING AND STORING THE TRAILER.		

There are two ways to transport the trailer. Shipping pertains to moving the trailer by truck, aircraft, railroad or sea. Towing means that the trailer will be hooked up to a vehicle capable of pulling 6,000 lbs., for road and off road transportation.

The following equipment is used for storing, shipping and towing the trailer:

- TARP - A waterproof and mildew-resistant tarp protects the trailer during transportation or storage. Tarp tie-downs are provided.
- TONGUE JACK - The tongue jack is equipped with a dolly wheel/skid plate assembly.
- PARKING BRAKES - The trailer is equipped with two independent, hand-operated, mechanical parking brakes.
- TIE DOWN RINGS - Four tie down rings are provided on the trailer chassis.
- SURGE BRAKE SYSTEM - The surge brake system assists in slowing down the trailer when braking the tow vehicle.
- CHAINS - The trailer has two safety chains and one breakaway chain for towing.
- TAIL LIGHTS - Two 24 VDC tail light assemblies are connected via a cable to a 12-pin plug for connecting to the towing vehicle receptacle.
- REFLECTORS - There are reflectors on the sides and rear of the trailer chassis.
- TIRE TOOLS - A tire jack and a lug wrench are provided for changing tires.

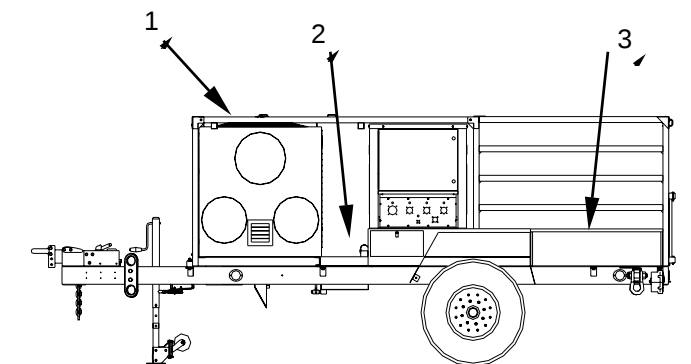


Figure 2-1 - Location of equipment on the HP-4DL

1 – Light Case (roof mounted)

2 – ECU Ducts

3 – DRASH Shelter(s) and all other equipment such as: Electrical Set, Stake Set Door Boots, Window Sets, etc.

WP O --- , -- -95151-00 Transporting the Trailer**IMPORTANT!**

THE OWNER OF THE TRAILER IS RESPONSIBLE FOR INVESTIGATING APPLICABLE LAWS AND REGULATIONS CONCERNING THE TRANSPORTATION OF OIL, DIESEL FUEL, AND PRESSURIZED REFRIGERANT.

014.00 Shipping Procedures

Before shipping the trailer, make sure all circuit breakers and switches are in the OFF position. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries. Put the tarp cover on and attach it to the trailer chassis by way of the tie-downs.

The trailer parking brakes should be engaged. The handles are located on each side of the trailer directly forward of the wheel.

To engage the parking brake, set the handle so that it is in-line or parallel to the trailer frame. To release the brake, place the handle perpendicular to the trailer frame.



Figure 2-2 - Parking Brake in ON (engaged) Position



Figure 2-3 - Parking Brake in OFF (released) Position

When the trailer is being transported, the wheels should be chocked.



Figure 2-4 - Wheel Properly Chocked

Do not use the dolly wheel to support the tongue jack during shipping. The skid plate resting on the deck surface will support the tongue jack. The trailer tongue jack must be fully retracted.

IMPORTANT!

**WHEN LOADING AND UNLOADING THE TRAILER,
AVOID HITTING THE RETRACTED TONGUE JACK
OR DAMAGE WILL OCCUR.**

The trailer should be secured to the transport deck using only the four tie-down rings. No additional tie downs should be attached from the trailer to the transport deck.



Figure 2-5 - Front of Shrink-wrapped Trailer Secured to Flatbed

The axle allows the trailer to move in an up and down motion. If extra tarpaulins are used to cover the trailer, they should be tied only to the trailer and not to the transport deck to avoid damaging the trailer.



Figure 2-6 - Rear of Shrink-wrapped Trailer Secured to Flatbed

END OF WORK PACKAGE

WP O --- , -- -95151-00 Towing Procedures

015.00 Before Towing

Before towing the trailer;

1. Verify that all circuit breakers and switches are in the OFF position.
2. Put on the trailer tarp and secure it to the trailer chassis.

IMPORTANT!
THE CARGO AREA MUST BE LOADED WITH A SHELTER TO ENSURE THAT THE TONGUE MEETS TACOM TOWABILITY REQUIREMENTS.

TOWING WITHOUT CARGO MAY RESULT IN DAMAGE TO THE TOWING VEHICLE.



Figure 2-7 - Tow Ring Connected to Pintle

3. Engage the tow ring (lunette) with the pintle on the towing vehicle.
4. Secure the pintle-locking device.
5. Release the trailer parking brakes (see Figure 2-2 and Figure 2-3, page 2-2).
6. Criss-cross the two safety chains under the tongue as shown in Figure 2-8 when attached to the towing vehicle so that the chains cradle the tongue in the event of a breakaway.



Figure 2-8 - Safety Chains Connected to Vehicle

7. Secure the breakaway chain to the frame of the towing vehicle, near the pintle as shown in Figure 2-9.
8. Be sure that the breakaway chain is as slack as possible during towing.
9. Verify that the breakaway lever is pointing towards the rear of the trailer and is fully released (no breakaway teeth are engaged in the leaf spring).



Figure 2-9 - Breakaway Chain Connected to Vehicle

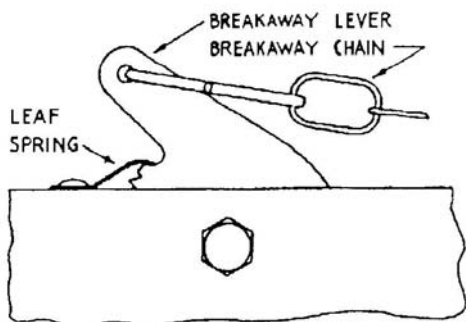


Figure 2-10 - Breakaway Lever in Fully Released Position

10. After the trailer is engaged to a vehicle, rotate the tongue jack handle to raise the dolly wheel / skid plate assembly off the ground.
11. There is an extension between the jack and the dolly wheel / skid plate assembly.
12. Remove the two assembly pins that hold the dolly wheel / skid plate assembly to the tongue jack extension (shown in Figure 3-11).

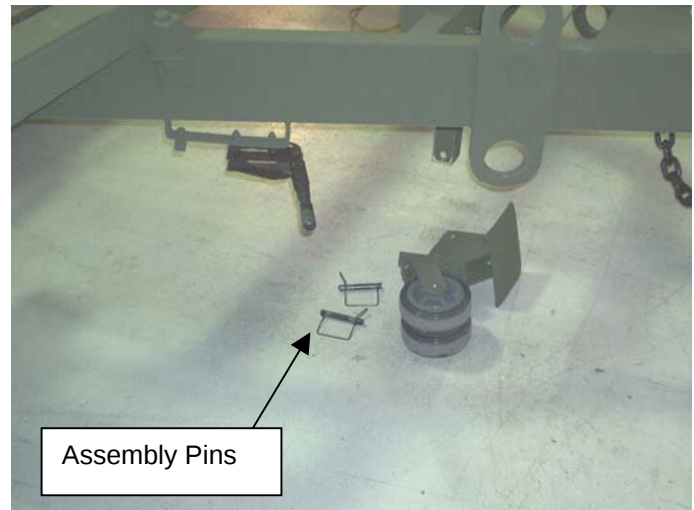


Figure 2-11 - Dolly Wheel/skid Plate Assembly Removed

13. The extension is held in place with one extension pin. Release the pin and push the extension all the way up into the tongue jack.
14. Secure the extension by reinserting the pin in the tongue jack.
15. Continue to rotate the tongue jack handle to fully raise the tongue jack.



Figure 2-12 - Jack Extension Shown in Extended Position

16. Place the dolly wheel / skid plate assembly onto the storage post with the skid plate facing the spare tire.
17. Secure in place by inserting the two assembly pins used to hold the assembly to the jack.



Figure 2-13 - Dolly Wheel/skid Plate Assembly Pinned to Storage Post

18. Connect the 12-pin 24 VDC taillight plug to the receptacle provided at the towing vehicle.
19. Verify that the plug is properly aligned with the receptacle on the vehicle.
20. Verify that there is enough slack in the tail light cable between the trailer and the vehicle to enable the trailer to turn while maintaining adequate ground clearance of the cable.
21. Test the following:
 - a. brake lights
 - b. running lights
 - c. turn signals
 - d. hazard lights.



Figure 2-14 - Tail Light Cable Connected to Back of Vehicle

22. The trailer has a tailgate or cargo netting to secure cargo. Inspect for damage before use and repair if necessary.
23. The cargo load must be equally distributed (see Figure 2-1, page 2-1).
24. Failure to load the trailer properly may result in serious damage or injury.

016.00 During Towing

Prior to departure, check performance of towing vehicle's and trailer's braking systems. The trailer should not push or pull the tow vehicle or jackknife during braking. Investigate erratic brake performance immediately.

Avoid tight turns. Extremely tight turns may actuate the surge brake system and/or engage the breakaway lever (see Figure 3-10).

Follow proper driving procedures for the vehicle being used for towing. Observe the road conditions and compensate for poor driving situations.

017.00 After Towing

After towing, reverse procedures a) through i) to release the trailer from the tow vehicle.

END OF WORK PACKAGE

WP O --- , -- -95151-00 Positioning the Trailer for Operation

The dolly wheel gives personnel the ability to move the trailer short distances, linear and rotational. This is beneficial when the trailer needs to be hooked up to a towing vehicle or be positioned with respect to the DRASH shelters for operation setup. The dolly wheel is part of the skid plate assembly (see Figure 3-11).

IMPORTANT!

UNDER NO CIRCUMSTANCES IS THE DOLLY WHEEL USED FOR SHIPPING OR TOWING. THE DOLLY WHEEL IS USED FOR DEPLOYMENT AND STORAGE ONLY.

If the terrain around the trailer is soft, uneven, or generally unfavorable, do not use the dolly wheel; use the skid plate.

To change from the skid plate to the dolly wheel or vice versa:

1. Position tow vehicle under the trailer tongue. Engage both parking brakes. Lower the trailer tongue onto the tow vehicle using the tongue jack.
2. After trailer tongue is secured, raise the dolly wheel / skid plate assembly by rotating the tongue jack handle.
3. Remove the lower assembly pin that holds the dolly wheel / skid plate assembly to the jack. Leave the upper assembly pin in place.
4. Rotate the dolly wheel / skid plate assembly around the upper pin so that the dolly wheel or skid plate is facing the ground. If the dolly wheel or skid plate does not clear the ground, continue to raise the jack. If the dolly wheel or skid plate still does not clear the ground, remove the extension pin and move the extension up into the jack until the dolly wheel or skid plate clears the ground. Reinsert the extension pin.
5. Reinsert the lower assembly pin to secure the dolly wheel / skid plate assembly.



Figure 2-15 - Dolly wheel in Position for Manual Adjustments

6. Lower the tongue jack until the tongue is supported by the dolly wheel or skid plate.
7. Continue to lower the tongue jack, raising the tongue off the tow vehicle support.
8. Once clear of the tow vehicle, use the tongue jack to level the trailer as desired for shipping, storage or operation.

END OF WORK PACKAGE

WP O --- , -- -95151-00 Storing the Trailer System**018.00 Before Storage**

Before storing the trailer,

1. Verify that all circuit breakers and switches are in the OFF position.
2. Disconnect the batteries by disconnecting the negative (black) lead from one of the batteries.
3. Drain the fuel tank if the trailer will be in storage for three months or longer.
4. The trailer should be stored on relatively level ground. Check the bull's-eye circular level on the front left corner of the trailer deck. If the trailer is to be stored outdoors, pitch the trailer slightly so that rainwater can run off the tarp. Put on the trailer tarp and secure tarp tie downs.
5. Engage the trailer parking brakes (see Figure 2-2 and Figure 2-3, page 2-2).
6. The trailer can be secured using its four tie-down rings. The wheels on the trailer can be chocked if required.

019.00 During Storage

Once every 3 months, the Genset and ECU should be started and operated for 3 to 4 hours, at half load to full load. Refer to Chapter 3, Operation. Make sure the trailer exhaust is properly vented. When completed, drain the fuel tank unless an auxiliary fuel source was used. (The auxiliary fuel source system is independent from the fuel tank.)

Once every 12 months, drain and replace the lubrication oil and engine coolant. Inspect and grease the bearings inside the ECU enclosure. Check tire pressures, surge brake fluid level, and the engine and ECU belts (for condition and tension). Refer to Chapter 5, Maintenance Procedures. Then run the Genset and ECU for 3 to 4 hours, at half load to full load. Refer to Chapter 4, Operation. Make sure the trailer exhaust is properly vented. When completed, drain the fuel tank unless an auxiliary fuel source was used. (The auxiliary fuel source system is independent from the fuel tank.)

In the event the negative battery connection cannot be disconnected during storage, the trailer is equipped with a battery charging receptacle located on the Genset Distribution panel (see Figure 3-4).

The batteries should be charged once every 6 months.

020.00 To Trickle Charge the Batteries

Plug the battery charger cable (provided with the trailer) into the battery charging receptacle (J5) on the Generator Distribution Panel.

Connect the opposing end into a 120 VAC power source.

Check the indicator lamp and charge the batteries for 8 hours.

To check the Voltmeter, turn the engine selector switch to the run position (see Figure 3-2) After 8 hours of trickle charging, the DC Voltmeter should read between 24 and 28 VDC. If not, then repeat the trickle charge for an additional 4 hours.

CAUTION!

TO AVOID OVERCHARGING THE BATTERIES, DO NOT CHARGE THEM FOR MORE THAN 24 HOURS AT ONE TIME. THIS WILL RESULT IN PREMATURE LOSS OF THE BATTERY LIFE CYCLE.

021.00 After Storage

Refer to Chapter 3, Operating Procedures.

END OF WORK PACKAGE

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3. OPERATING PROCEDURES

3.1 General Operating Information

The following chapter contains general information for operation of the trailer.

Note that this manual is not intended to be a substitute for proper training. We strongly recommend that operators receive training directly from DHS.

The cautions and warnings point out known conditions that are potentially hazardous. However, no manual can cover every possible situation. If in doubt, contact DHS.

Before calling DHS for assistance, please identify the trailer by its DHS Vehicle Identification Number (VIN). The VIN is indicated on the trailer nameplate on the front of the trailer by the tow ring.

Only authorized DHS technicians should perform Service and repairs beyond the scope of this manual.

DHS SYSTEMS LLC Contact Information

24 Hour Hotline: 800-977-3647
FAX: 845-365-2114
e-mail: drash@drash.com

WP O --- . -- -95151-00 Panel Locations

Operation of the UST Trailer involves the following panels (identified in Figure 3-1):

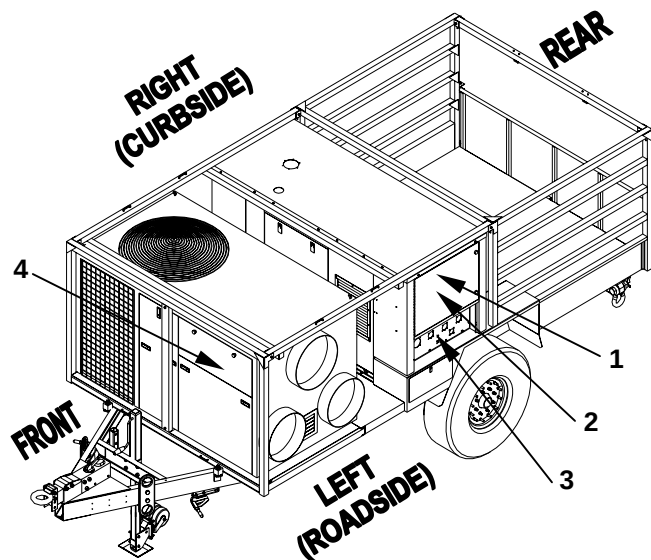


Figure 3-1 - Panel Locations

- 1 - Genset Instrument Panel**
- 2 - Genset Power Control Panel**
- 3 - Genset Power Distribution Panel**
- 4 - ECU Control Panel**

022.00 Genset Instrument Panel

The Genset Instrument Panel is located roadside (the left side of the trailer) on the upper part of the Genset enclosure. A hinged access door protects the panel from the elements. Following are brief descriptions of the Genset Instrument Panel components identified in Figure 3-2.

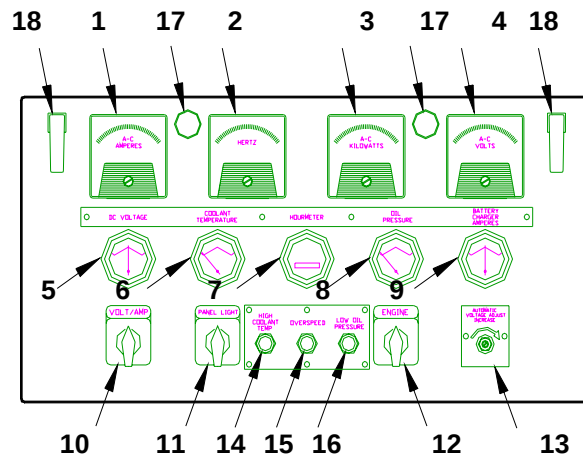


Figure 3-2 - Genset Instrument Panel

1. Ammeter, AC, 0-100 A – Indicates the current drawn from the Genset or Shore Power source.
2. Frequency Meter, 55-65 Hz – Indicates the operating frequency generated by the Genset or Shore Power source.
3. Watt Meter, AC, 0-30 kW – Indicates the power drawn from the Genset or Shore Power source.
4. Voltmeter, AC, 0-300 VAC – Indicates the operating voltage generated by the Genset or Shore Power source.
5. Voltmeter, DC, 16-36 VDC – Indicates the voltage from the battery system.
6. Coolant Temperature Gauge, 100-240 °F – Indicates the engine coolant temperature.
7. Hour Meter, Total Hours Accumulated – Indicates the operating hours of the engine. The Hour Meter is a guide for scheduling periodic maintenance.
8. Oil Pressure Gauge, 0 – 80 psi – Indicates engine oil pressure.
9. Battery Charger Ammeter, DC, (-)10 – 0 – (+)10 A Indicates the rate of charging current to the battery system from the 120 VAC battery charger receptacle (J5) located in the Genset Power Distribution Panel (see Figure 4-4).
10. Ammeter Voltmeter Selector Switch – The four-position switch (OFF, L1 - L2, L2 - L3, L3 - L1) selects any two legs of the Genset or Shore Power source for the AC Ammeter and Voltmeter readings.
11. Panel Light Switch – Turns on panel lights. Turns off the lights when released.
12. Engine Selector Switch – The four-position switch (PREHEAT-OFF-RUN-START) controls the starting and stopping of the engine.
13. Potentiometer (Voltage Adjust) – Enables manual adjustment of the voltage generated by the Genset (fine adjustment only).
14. High Coolant Temp. Indicator Light, Red, Push-to-test, Blackout – Illuminates if the engine shuts down because of high coolant temperature.
15. Overspeed Indicator Light, Red, Push-to-test, Blackout – Illuminates if the engine shuts down because of an overspeed condition.
16. Low Oil Pressure Indicator Light, Red, Push-to-test, Blackout – Illuminates if the engine shuts down because of low oil pressure.
17. Panel Light – Illuminates panel.
18. Latch – Enables access behind the Instrument Panel into the electrical enclosure. For authorized DHS technicians only.

023.00 Genset Power Control Panel

The Genset Power Control Panel is located roadside (the left side of the trailer) below the Genset Instrument Panel. The same hinged access door protects the power control panel from the elements. Following are brief descriptions of the power control panel components identified in Figure 3-3.

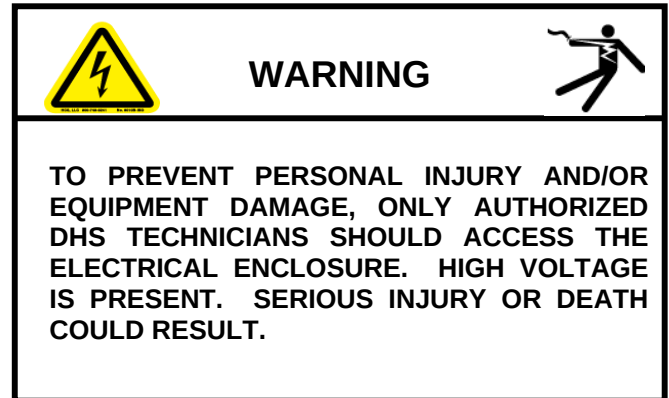
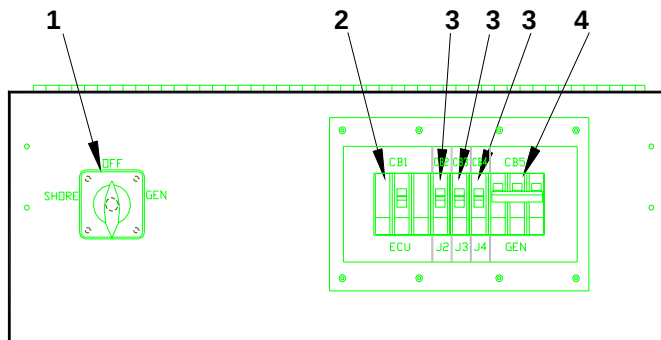


Figure 3-3 - Genset Power Control Panel

1. Power Selector Switch, 35 kW – The 3-position switch (SHORE-OFF-GEN) selects the power source.
2. Circuit Breaker, 3-pole, 50 A (CB1) – protects the ECU.
3. Circuit Breaker, 1-pole, 20 A (CB2, CB3 or CB4) – protects one of the three 120 VAC outlets (J2, J3 or J4, respectively) mounted at the Power Distribution Panel.
4. Circuit Breaker, 3-pole, 80 A (CB5) – protects the Genset.

024.00 Genset Power Distribution Panel

The Genset Power Distribution Panel is located roadside (the left side of the trailer) on the lower part of the Genset enclosure. A hinged access door protects the panel from the elements. Following are brief descriptions of the power distribution panel components identified in Figure 3-4.

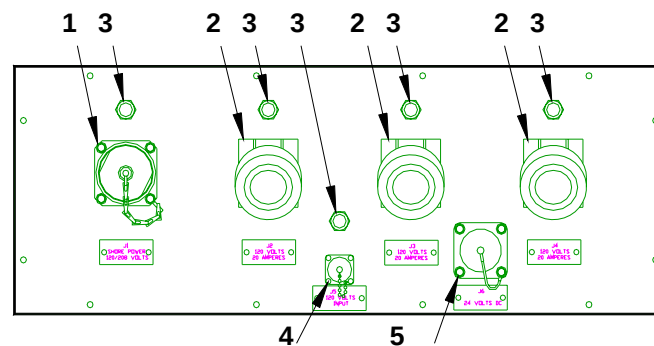


Figure 3-4 - Genset Power Distribution Panel

1. **Receptacle, Shore Power, 120/208 VAC, 60 A, 3-phase, 5-wire (J1)** – Connects the generator to an external power source. The 5', 60 A Shore Power Cord connects to this inlet; the other end of the cord is an open pigtail.
2. **Receptacle, 120 VAC, 20 A, 1-phase, 3-wire (J2, J3 & J4)** – Provides AC power for shelter lighting and utility outlets. The two 30', 120 VAC, 20A Trailer Leads and the one 50', 120 VAC, 20 A Trailer Lead plug into these receptacles.
3. **Indicator Lamp, Amber, Push-to-test, Blackout** – Indicates power is present at the respective receptacle.
4. **Receptacle, 120 VAC, 3-wire (J5)** – Allows battery charging from a 120 VAC external source. The 5' Battery Charger Cable plugs into this receptacle.
5. **Receptacle, 24 VDC (J6)** – The NATO/Slave receptacle accepts 24 VDC power for emergency starting from an external source or provides 24 VDC power to an external requirement.

025.00 ECU Control Panel

The ECU Control Panel is located on the front of the ECU enclosure (see Figure 3-1, page 3-1). A hinged access door protects the Control Panel from the elements.

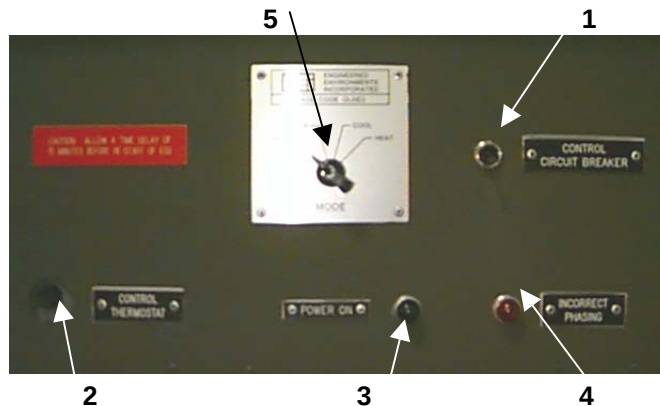


Figure 3-5 - ECU Control Panel

1. **Circuit Control Breaker**– Allows the operator to manually shut down the ECU.
2. **Thermostat Dial, Fahrenheit** – Allows the operator to regulate shelter interior temperature by manually selecting the temperature.
3. **Power Indicator Light, Green** – Illuminates when power is present in the unit.
4. **Phase Indicator Light, Red** – Illuminates when the connection to an external (shore power) power source is **incorrectly** phased.
5. **ECU Selector Switch** – The four-position switch (OFF-FAN- COOL-HEAT) selects the mode of operation

END OF WORK PACKAGE

WP O --- , -- -95151-00 Starting Procedures

026.00 Trailer Pre-Start Procedure

1. **Operational Position:** Determine where the trailer will be positioned for operation. Choose an area that is free of any obstructions that would interfere with the air intakes and exhausts of the trailer and that is as level as possible. Remove the trailer tarp. Check that the electrical leads and the ECU ducts will reach the shelter(s).

WARNING!

THE EXHAUST FUMES SHOULD BE DIRECTED AWAY FROM THE SHELTER, THE TRAILER, AND PERSONNEL. INSTALLATION OF THE OPTIONAL EXHAUST EXTENSION MAY BE DESIRED.

After positioning the trailer in an operational position, engage the two hand-operated parking brakes (handles parallel to the trailer frame).

To properly level the trailer, use the adjustable tongue jack while checking the bull's-eye circular level mounted on the front left corner of the trailer deck.

CAUTION!

TO PREVENT EQUIPMENT DAMAGE, THE UNIT SHOULD BE LEVEL.

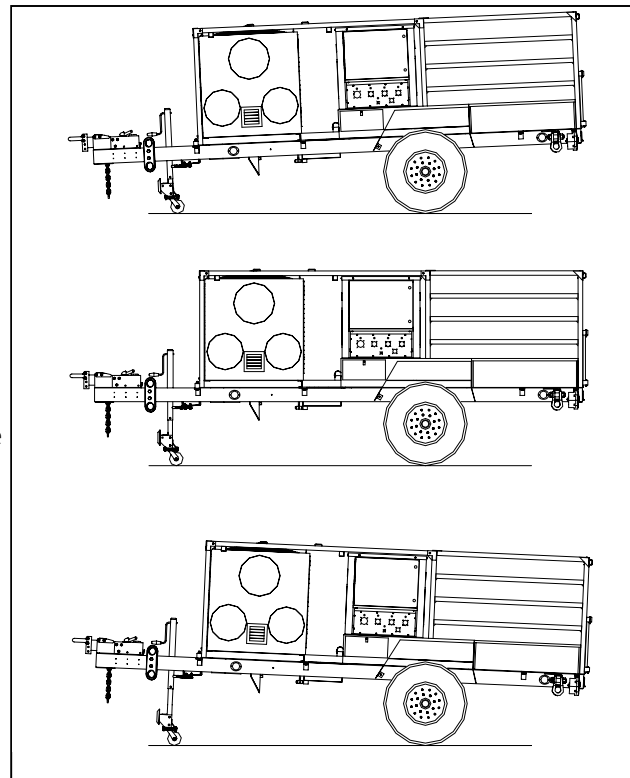


Figure 3-6 - Trailer Operating Position (Side View)

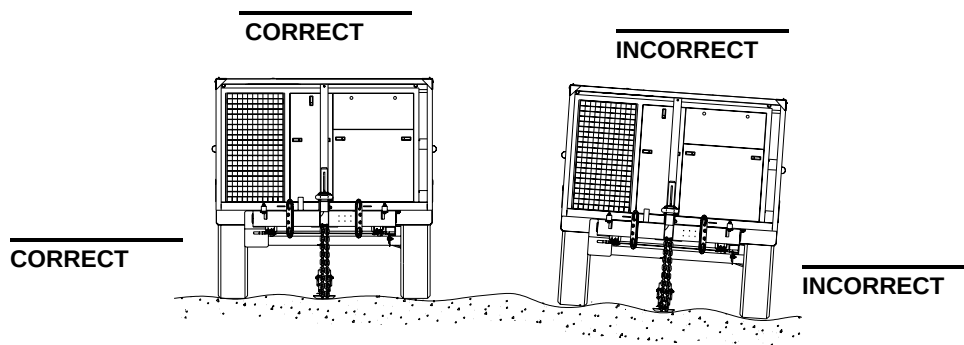


Figure 3-7 - Trailer Operating Position (Front View)

2. **Ground Connection:** The three-section ground rod provided in brackets (Item 2 of Figure 3-8) on the trailer bed should be driven into the ground using the supplied sledgehammer. Assemble the ground rod sections as necessary. Connect the ground wire (#6 AWG green wire) between the ground rod and the ground stud (Item 1 of Figure 3-8)

located on the roadside of the trailer frame. The sledgehammer and ground wire are found in the storage compartment or saddle bag.

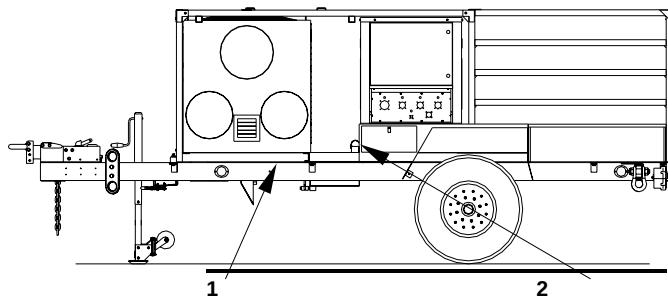


Figure 3-8 - Location of ground stud and ground rod brackets

1 – Ground stud

2 – Ground rod brackets

3. **Pre-Start Inspection:** Before using the unit, perform items 1 through 12 of the Operational Checklist. See Table 3-2 - Operational Checklist, page 3-15.
4. Release the latches to the enclosure access door.
5. Allow the access door to come out from the top of the enclosure and lift. This will release the bottom of the door.
6. Remove access door.
7. reconnect the batteries if the trailer has been in storage.

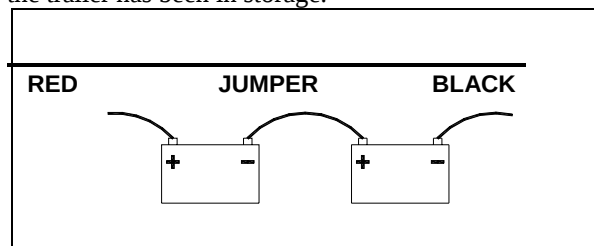


Figure 3-9 - Battery wire color identification

027.00 Genset Pre-Start Procedure

1. **Fuel Supply:** Turn the Fuel Supply Selector Switch, located forward of the axle on the curbside (or right side) of the trailer, to the desired position. (See Figure 3-10).
2. Ensure that the selected fuel supply is adequate.

1 - Fuel tank drain plug

2 - Coolant drain plug

3 - Lube oil drain plug

4 - Fuel Supply Selector Switch

5 - Auxiliary fuel supply connection

6 - Auxiliary fuel return connection

Figure 3-10 - Location of drain plugs, fuel switch and auxiliary fuel connections

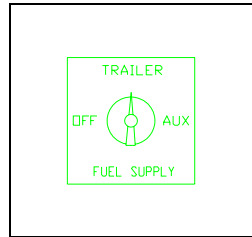


Figure 3-11 - Fuel Supply Selector Switch on the TRAILER position

3. The Fuel Supply Selector Switch should be fully engaged to the TRAILER position if the engine is to run from the trailer fuel tank.
4. Check the fuel level in the trailer fuel tank by viewing the mechanical fuel level indicator located next to the 4-inch diameter fuel filler. The fuel filler (Item 3 of Figure 3-12) and fuel level indicator (Item 4 of Figure 3-12) are located under a hinged access door between the ECU and the Generator. The access door (Item 1 of Figure 3-12) is secured with a lift and quarter-turn latch (Item 2 of Figure 3-12).

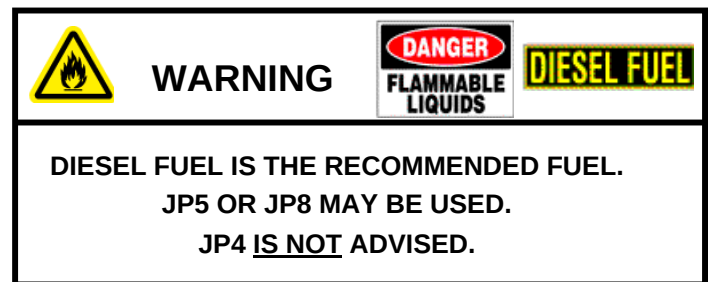
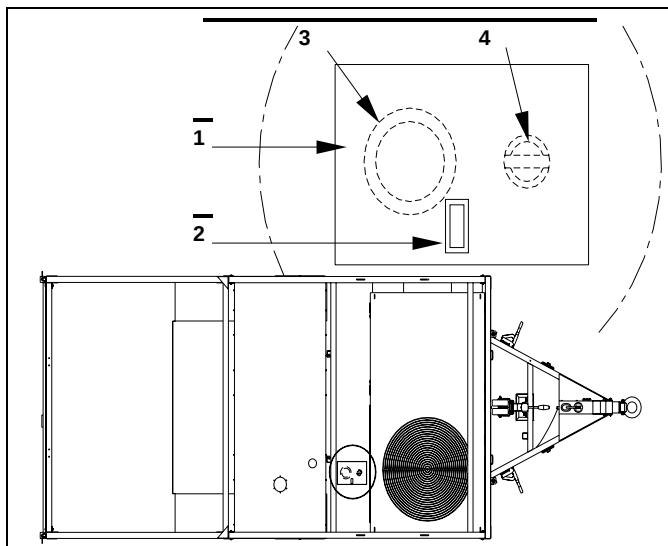


Figure 3-12 - Location of fuel filler and fuel level indicator

- 1 - Hinged access door**
2 - Quarter-turn latch
3 - Fuel filler
4 - Fuel level indicator

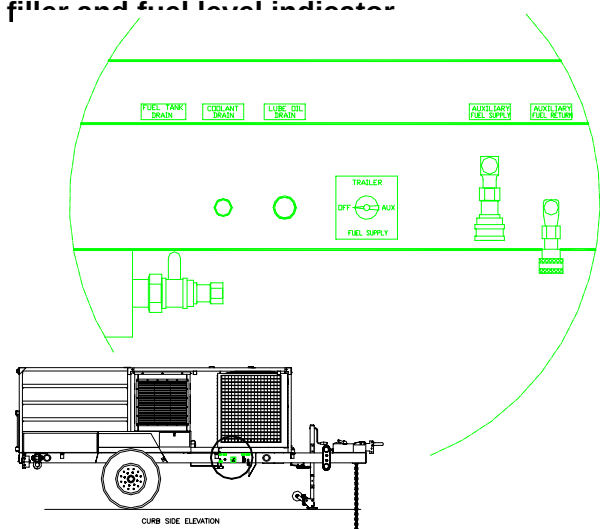
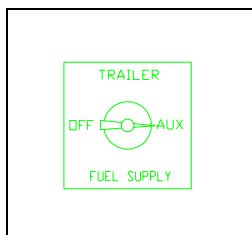
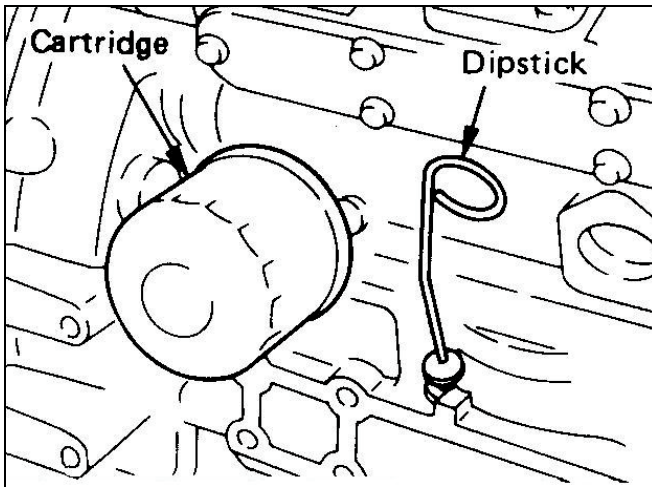


Figure 3-13 - Fuel Supply Selector Switch in AUX position

5. The Fuel Supply Selector Switch should be fully engaged to the AUX position when fuel is to be supplied from an auxiliary source. A supply fuel hose and return fuel hose are supplied with the trailer (in the storage compartment). They are used to connect to an auxiliary fuel supply. Quick disconnects (Items 5 and 6 of Figure 4-10) are located on the trailer frame on the fuel switch side of the trailer, forward of the axle.
6. **To supply fuel from an auxiliary source:**
 - a. Connect the supply hose to the trailer connection.
 - b. Place the other end (the end with the filter) of the supply hose into the fuel source (container).
 - c. Connect the return hose to the trailer and place the other end into the fuel source (container).
 - d. Turn Fuel Supply Selector Switch to AUX.
 - e. Prime the bulb on the supply hose until resistance is felt.
 - f. Check for any coolant, oil or fuel leaks.
 - g. Tighten connections as required before running the generator set. Contact DHS if you cannot fix the leak.

028.00 Lubricating Oil

1. Ensure that the lubricating oil (engine oil) is at the proper level.

**Figure 3-14 - Oil dipstick and filter**

2. The engine dipstick and oil filter are located on the engine block, and are accessed by removing the rear access door of the Genset enclosure.

CAUTION!

**DO NOT REMOVE OIL DIPSTICK WITH THE
ENGINE RUNNING.**

3. The engine should be turned off for five to ten minutes to allow the oil to settle in the crankcase. The dipstick should be removed, wiped clean, inserted and removed again. The oil on the dipstick should be between the two marks on the dipstick. Oil should be added if the level is at or below the lower mark. Oil should be added at the filler cap shown in figure 5-6. Add oil as necessary and re-check the oil level. See Chapter 5, Section 3.1.5, for recommended oil. **Do not operate the engine with a low oil level.**

IMPORTANT!

THE ENGINE IS SUPPLIED WITH BREAK-IN OIL. THIS OIL SHOULD BE DRAINED AND REPLACED WITH RECOMMENDED LUBRICATION OIL BETWEEN THE FIRST 90 AND 100 HOURS OF OPERATION (SEE CHAPTER 5).

4. If the dipstick indicates an excessive amount of oil in the engine, then some oil will need to be drained. Refer to Chapter 5, Section 3.3.4.
5. **c) Engine Coolant:** Ensure that coolant is at the proper level and has the proper color and consistency.. Check the coolant level in the coolant bottle and in the radiator.

The coolant bottle may be viewed with the rear Genset enclosure access door removed. The bottle should be 1/3 to 1/2 full when the engine is cool. Add or remove coolant from the bottle to achieve the proper level. If the coolant does not have the proper color or consistency, then the coolant should be drained and replaced (see Chapter 5, Section 3.3.9).

The radiator cap is reached by unscrewing the access cap located on the top of the Genset enclosure (see Figure 5-15). Remove the radiator cap. Coolant should be within one inch of the filler neck. If required, fill with coolant through the access cap, using the funnel provided with the trailer. See Chapter 5, Section 3.1.6 for recommended coolant.

WARNING!

DO NOT REMOVE RADIATOR CAP IF ENGINE IS WARM. ALLOW ENGINE TO COOL. THE COOLANT IS UNDER PRESSURE. SERIOUS INJURY COULD RESULT.

IMPORTANT!

THE OWNER OF THE TRAILER IS RESPONSIBLE FOR INVESTIGATING APPLICABLE LAWS AND REGULATIONS CONCERNING THE DISPOSAL OF ENGINE COOLANT.

6. At the Genset Power Control Panel, turn the Power Selector Switch to the OFF position. Turn OFF all circuit breakers (see Figure 4-3).

029.00 Genset Start Procedure

1. Start the engine by placing the Engine Selector Switch in the PREHEAT position for approximately 10 to 20 seconds. Then hold the switch in the START position (for no more than 30 seconds). After the engine has started, release the selector switch. The selector switch will spring-return to the RUN position.
2. Immediately after starting the engine, check the lubrication oil pressure at the Oil Pressure Gauge on the instrument panel. 20 psi is the minimum. If pressure does not rise promptly to over 20 psi, stop the engine by turning the Engine Selector Switch to OFF. Check the oil level (see Procedure 3.2c). Also check to see if leaks are evident, both inside and under the enclosure. Also check the oil filter is securely attached to the engine. Add oil if required. Typical oil pressure is 30 to 45 psi.
3. Turn the Power Selector Switch to the GEN position. The generator circuit breaker CB5 must be in the OFF position.
4. Turn the Ammeter Voltmeter Selector Switch from OFF to the L1-L2 position. Read the AC Voltmeter at the instrument panel. It should read 208 VAC. If not, fine-tune the voltage to 208 VAC using the Voltage Adjust Potentiometer on the instrument panel. With the voltage set, verify that the Frequency Meter is reading properly, approximately 60.5 Hz at no-load. At this point, there should be no readings on the AC Ammeter and Wattmeter.
5. Turn the Ammeter Voltmeter Switch to the L2-L3 position and check that the AC Voltmeter and Frequency Meter readings are the same as for L1-L2. Do the same for the L3-L1 position. If the Genset does not deliver the desired voltage and frequency or if there is a marked difference among the three legs, do not operate the Genset; contact DHS.
6. Move the generator circuit breaker CB5 to the ON position. Power is now available from the generator.
7. Power is made available at the J2, J3 and J4 receptacles by moving CB2, CB3 and CB4 to the ON position. When power is available at a receptacle, the power indicator light above that receptacle will illuminate. All power indicator lights are equipped with a cat's-eye closure to prevent light from emitting if so desired and a "push to test" feature to test lamp status.
8. Connect the DRASH trailer leads to receptacles J2, J3, and J4 (located on the Genset Power Distribution Panel, see Figure 4-4). The receptacles are protected by 20 Amp circuit breakers CB2, CB3 and CB4, respectively. The leads are secured by turning their connection collars clockwise.
9. Periodically check all meter readings on the Genset Instrument Panel.

030.00 ECU Start Procedure

Connect the insulated ducts between the shelter ports and the ECU. There are one supply port and two return ports on the ECU. Refer to Figure 4-15 for location of the ECU ports. Airflow is maximized by keeping the ducts as straight as possible.

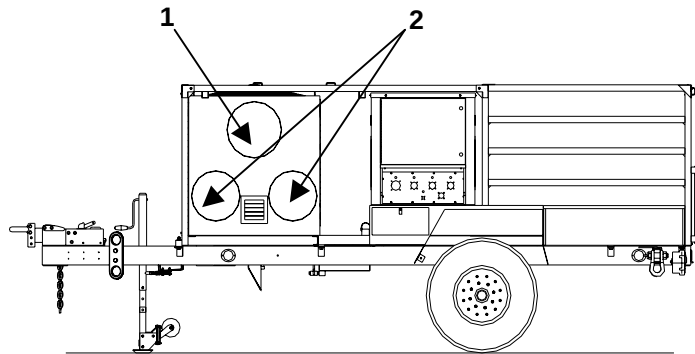


Figure 3-15 - Location of ECU supply and return ports

- 1 – Supply port**
2 – Return port

To install the ECU ducts:

1. Remove the duct caps from the ECU ports.
2. Locate the duct set, consisting of two return ducts with duct filters (mesh filter attachments) and one supply duct.

continued

	NOTE	
DO NOT OVER CRANK THE ENGINE. ATTEMPTS TO START SHOULD BE LIMITED TO A MAXIMUM OF FIVE CONSECUTIVE STARTS FOR A MAXIMUM DURATION OF 30 SECONDS PER ATTEMPT. IF UNIT DOES NOT START, REFER TO THE TROUBLESHOOTING SECTION.		

3. Attach the supply duct to the upper ECU port and the return ducts to the lower ECU ports. Secure the ducts with their belted cuffs.
4. If cooling shelters, pull supply ducting through upper shelter ports. Pull return ducting through lower shelter ports. Make sure that there are approximately 2' of supply ducting or 1' of return ducting pulled into the shelter at each port.
5. If heating shelters, pull supply ducting through lower shelter ports. Pull return ducting through upper shelter ports. Make sure that there are approximately 2' of supply ducting or 1' of return ducting pulled into the shelter at each port.
6. Attach the duct filter at the open (shelter) end of each return duct.
7. Ensure that the airflow to and from the ECU is unobstructed. This includes the fan on the top and the coils and louvers on the sides of the unit.
8. Move the ECU circuit breaker CB1 to the ON position. The circuit breaker is located on the Genset Power Control Panel (see Figure 3-5, page 3-4).
9. The green Power Indicator Light should come on and the red Phase Indicator Light should not be lit. If the red light does come on, the wiring to the ECU is out of phase and must be corrected (see Section 5, Troubleshooting). Do not run the ECU with the red light on.
10. Set the thermostat to the desired temperature required to maintain a comfortable interior shelter temperature. The temperature difference between the ambient temperature and the interior shelter temperature is a function of many variables.

The performance of the ECU is dependent on the proper installation of the ECU ducts, DRASH shelter plenums and the DRASH shelter(s). To get the most from the ECU:

- Keep all shelter doors, exterior and interior, closed as much as possible. Close all exterior and interior windows. There is a dead air space between the exterior and interior covers of shelter(s) and accessories such as Connector Sets or S.E.A.L.'s.
- Install DRASH Plastic Windows in both the Interior and Exterior Covers to let ambient light into the shelter while maintaining the dead air space (two window sets are required for this configuration).
- In very hot and sunny conditions, one can use the DRASH Plastic Windows on the Interior Cover and open the windows of the Exterior Cover. This configuration allows for some convection of the air between the covers to prevent a temperature buildup inside the Exterior Cover.
- Shading the shelter with camouflage netting or other means reduces the solar energy absorbed by the shelter.
- Install other DRASH accessories such as Subfloors (also called Cushion/Insulated Underfloors), Vestibule Curtains and Plastic Strip Doors to reduce shelter heat loss

These measures are very important in extreme conditions hot or cold. For more information, refer to the Operator's Manual provided with each shelter or contact DHS.

11. Turn the ECU Selector Switch to the appropriate position. The modes of operation are:

- OFF, no ECU operation
- FAN, circulating fan only operation
- COOL, compressor and fan operation
- HEAT, electric heating element and fan operation.

END OF WORK PACKAGE

WP O --- , -- -95151-00 Stop Procedures**031.00 ECU Stop Procedure**

1. On the ECU Control Panel, turn the ECU Selector Switch to the OFF position.
2. On the Genset Power Control Panel, turn off circuit breaker CB1 (see Figure 3-3, page 3-3).

032.00 Genset Stop Procedure

1. Turn the remaining circuit breakers to the OFF position (see Figure 3-3, page 3-3). There should be no load on the generator.

CAUTION!

ENSURE THAT ALL CIRCUIT BREAKERS ARE IN THE OFF POSITION PRIOR TO STOPPING ENGINE.

2. Turn the Power Selector Switch to the OFF position (see Figure 4-3).
3. Turn Ammeter Voltmeter Selector Switch to the OFF position (see Figure 4-2)
4. Turn the Engine Selector Switch to the OFF position (see Figure 4-2).
5. At the completion of operation:
 - a. Run the fuel down to a low level (1/2-inch left in fuel tank) before initiating the stop procedures described above.
 - b. Drain the fuel tank to eliminate old fuel, sludge and/or water.
6. Check around the trailer and inside the enclosures for any leaks.
7. Install and attach the trailer tarp.

END OF WORK PACKAGE

WP O --- , -- -95151-00 Shore Power Operation

The equipment connected to the Genset may be powered from an external source.

Before connecting or disconnecting shore power, make sure that the Engine Selector Switch, the Power Selector Switch and all of the circuit breakers are in their OFF positions.

Connect the 5' Shore Power Cord to the Shore Power Inlet, J1. The other end is an open pigtail and must be connected to the external power source by qualified electrical personnel only.

COLOR	CONNECTION
BLACK	A – PHASE
RED	B – PHASE
BLUE	C – PHASE
WHITE	NEGATIVE
GREEN	GROUND

Table 3-1 - Pigtail Wire Identification

033.00 Shore Power Start Procedure

1. With all circuit breakers in the OFF position, turn the Power Selector Switch from the OFF position to the SHORE position.
2. Turn the Ammeter Voltmeter Selector Switch to the ON position. The Genset Instrument Panel will now monitor external source power.
3. Circuit breakers CB1 through CB4 may be turned ON as required. The generator circuit breaker CB5 remains turned OFF.
4. The ECU Start Procedure remains the same.



WARNING



IF THE RED PHASE INDICATOR LIGHT ON THE ECU CONTROL PANEL COMES ON, SHORE POWER IS PHASED INCORRECTLY. THE ECU SELECTOR SWITCH, THE CIRCUIT BREAKERS AND THE POWER SELECTOR SWITCH SHOULD BE TURNED OFF. THE PIGTAIL END OF THE SHORE POWER CORD MUST BE RECONNECTED BY SWITCHING TWO OF THE WIRES. REFER TO CHAPTER 5, TROUBLESHOOTING.

034.00 Shore Power Stop Procedure

1. Turn OFF the ECU Selector Switch.
2. Turn OFF all circuit breakers.
3. Turn OFF the Ammeter Voltmeter Selector Switch.
4. Turn OFF the Power Selector Switch.
5. Disconnect Shore Power Cord pigtail. This must be done by qualified personnel only.

END OF WORK PACKAGE

WP O --- , -- -95151-00

Operating Checklist

SEQUENCE			B = BEFORE OPERATION D = DURING OPERATION A = AFTER OPERATION		
B	D	A	Item To Be Inspected	Description	Equipment Is Not Ready/Available If:
•			Trailer	Trailer parking brakes must be in the engaged position. Adjust braking force if necessary by using knob at the end of parking brake lever.	Brakes are off.
•			Trailer	Remove trailer tarp.	Trailer tarp is in place.
•			Trailer	Visually inspect for fuel, oil and coolant leaks. Inspect inside the Genset and ECU enclosures.	Leakage is detected during inspection.
•			Trailer	Check that trailer is free of obstructions interfering with intakes and exhausts.	Intakes or exhausts are blocked.
•			Trailer	Check for proper ground connections.	Ground rod or cable is missing or not connected.
•			Trailer	Level trailer with respect to the bull's eye level.	Trailer is not level.
•			Trailer	Check fire extinguisher.	Extinguisher is missing or under charged.
•			Genset, batteries	Visually inspect batteries for cracked or broken cases, corrosion on terminal posts, damaged or frayed cables or loose connections.	Batteries are defective.
•			Trailer, fuel tank	Fill fuel tank.	Fuel level is low.
•			Genset, engine lubrication oil	Check the engine oil level with the dipstick.	Oil level is low or high.
•			Genset, engine cooling system	Check coolant level. Proper level is 1" below the overflow pipe. Add coolant as required.	Coolant level is low.
•			ECU, bearings	Check the bearings that support the fan shafts.	Bearings need grease or replacement.
•			Genset and ECU enclosures	All access doors should seal and fit properly.	Access doors are not in place or do not close properly.
	•		Genset Instrument Panel, AC Ammeter	Check that current does not exceed 60 amps.	Current exceeds 60 Amps.
	•		Genset Instrument Panel, Frequency Meter	Check frequency; normal indication is 60 Hz +/- 2%.	Frequency cannot be properly adjusted.
	•		Genset Instrument Panel, Watt Meter	Check that the applied load does not exceed 20 kW.	Load exceeds 20 kW.

SEQUENCE B = BEFORE OPERATION D = DURING OPERATION A = AFTER OPERATION					
B	D	A	Item To Be Inspected	Description	Equipment Is Not Ready/Available If:
	•		Genset Instrument Panel, Volt Meter	Check voltage; the meter should indicate 208 volts. Use the Potentiometer to fine tune voltage.	Voltage cannot be properly adjusted.
	•		Genset Instrument Panel, DC Voltmeter	Check voltage of the battery system.	If less than 24 VDC or greater than 28VDC.
	•		Genset Instrument Panel, Coolant Temperature Gauge	Check engine coolant temperature; normal indication is 170°-200°F.	Temperature exceeds 200°F.
	•		Genset Instrument Panel, Oil Pressure Gauge	Check oil pressure; normal indication is 20 to 55 psi.	Pressure is below 20 psi.
	•		Genset Instrument Panel, Battery Charger Ammeter	Check ammeter; normal indication is 0 amps. If batteries are being charged via the 120 VAC Battery Charger Receptacle, the normal indication is 0 to 5 amps.	Not applicable
	•		Genset Instrument Panel, High Coolant Temperature Indicator Light	Check light. When lit, it indicates an engine shutdown due to a coolant temperature over the high limit of 200°F. Note that all selector switches and circuit breakers must be turned OFF and the fault condition corrected before attempting to restart the engine.	Fault condition is not corrected.
	•		Genset Instrument Panel, Overspeed Indicator Light	Check light. When lit, it indicates an engine shutdown due to an overspeed condition. Note that all selector switches and circuit breakers must be turned OFF and the fault condition corrected before attempting to restart the engine.	Fault condition is not corrected.
	•		Genset Instrument Panel, Low Oil Pressure Indicator Light	Check light. When lit indicates engine shutdown due to low oil pressure. All selector switches and circuit breakers must be turned OFF and the fault condition corrected before attempting to restart the engine.	Fault condition is not corrected.
	•		Trailer, fuel tank	Check fuel level. Fill as required.	Fuel tank is empty.
		•	Trailer, fuel tank	Run fuel down to a low level (1/2-inch left in tank) at completion of operation. Drain fuel tank.	Old fuel, sludge and/or water is in fuel tank.
		•	Trailer	Visually inspect the trailer for fuel, oil and coolant leaks. Inspect inside the Genset and the ECU enclosures.	Leakage is detected during inspection.
		•	Trailer	Install and attach the trailer tarp.	Tarp is not installed and attached.

Table 3-2 - Operational Checklist

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4. MAINTENANCE

4.1 General Maintenance Information

The following chapter contains general information for operator-level qualified personnel. A qualified person is one who is familiar with this manual, the operation of the UST Trailer and the hazards involved in its operation and maintenance and who has been certified by the DHS Training program.

This chapter describes the procedures for daily maintenance as well as periodic maintenance for every 50-hour, 250-hour, 500-hour and 1000-hour interval.

Periodic maintenance for every 2000-hour, 6000-hour, and 12000-hour interval is not covered in this manual; maintenance at these intervals should be performed by authorized DHS technicians. Maintenance and service contracts can be arranged with DHS Logistics Co. Parts for maintenance and service can also be obtained from DHS Logistics Co.

DHS SYSTEMS LLC Contact Information

Phone: 800-977-3647
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This chapter covers each of the main trailer components (trailer chassis, engine, generator and ECU) separately. Please refer to the table at the end of the chapter for an overview of periodic maintenance for the entire UST Trailer.

This manual is not intended to be a substitute for proper training. We strongly recommend that operators receive training directly from a DHS Product Support or Field Service Representative.

The cautions and warnings point out known conditions that are potentially hazardous. Note that no manual can cover every possible situation. If in doubt, contact DHS.

Before calling DHS for assistance, please identify the trailer by its DHS Vehicle Identification Number (VIN). The VIN is indicated on the trailer nameplate on the front of the trailer by the tow ring.



Figure 4-1 - Location of VIN Plate

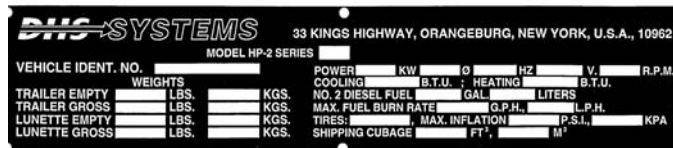


Figure 4-2 - Detail of VIN Plate

The engine, generator, ECU and trailer chassis also have serial numbers. If a problem exists with a particular component, identifying its serial number along with the VIN will help DHS respond as quickly as possible.

Only authorized DHS technicians should perform Service and repairs beyond the scope of this manual.

4.2 Chassis Characteristics

The trailer chassis is constructed from aluminum and steel components. A single axle with Torflex suspension is rated for 6000 lb. A dolly wheel / skid plate assembly supports the front of the trailer. There are two mechanical parking brakes, one for each wheel, and a surge brake system for use when towing. A 25-gallon fuel tank is built into the chassis. Periodic maintenance of the trailer is necessary and must be part of the routine of operating the UST Trailer. Maintenance activities should be performed at the following intervals.

WP M --- . -- -95151-00 Periodic Chassis Maintenance

035.00 Daily Maintenance

Perform a visual walk-around inspection of the following points;

1. Fix any fuel, coolant, oil or fluid leaks.
2. Make sure the UST Trailer is properly positioned and level.
3. Make sure the UST Trailer is free of debris, inside and outside the enclosures.
4. Check the fire extinguisher.
5. Check the tires for proper tire pressure.
6. Make sure all enclosure access doors close properly.

036.00 Every 250 Hours of Operation:

1. Check the surge brake fluid (see 038.00 – below).
2. Check the parking brakes.
3. Lubricate the tongue jack. Use standard lithium soap greas



Figure 4-3 - Grease Fitting on Tongue Jack

037.00 Every 500 Hours of Operation:

1. Check all nuts, bolts, fittings, and connections. Tighten as required.
2. Wash the trailer and the enclosures.

038.00 Checking the Surge Brake Fluid

Check the surge brake fluid level every 250 hours of operation and the condition of the fluid.

1. Using a 1-1/8" open end or adjustable wrench, unscrew the cap on top of the surge brake fluid reservoir.
2. If the brake fluid is dirty, cloudy, or watery or rust is evident inside the master cylinder reservoir, the fluid should be drained and replaced. Contact DHS.
3. The brake fluid should be level with the top of the reservoir (just below the cap threads). Fill as required with an approved motor vehicle brake fluid.
4. Screw the cap back on. Tighten with the wrench.

039.00 Checking the Parking Brakes

The mechanical parking brakes should be checked every 250 hours of operation. They may become loose over time. To correct this,

1. Release the parking brake to the OFF position. The hand knob can be rotated to increase the braking force applied to the wheel.
2. To test the adjustment, engage the brake to the ON position.
3. Repeat if needed. The cables may be lubricated with WD40 if necessary to prevent sticking.

END OF WORK PACKAGE

WP M --- , -- -95151-00 Engine Characteristics

040.00 Engine Component Identification

See Figure 4-4.

041.00 Engine Type

The engine is a four-cylinder, liquid cooled, indirect injection, 1800 rpm, naturally aspirated Diesel.

042.00 Ambient Temperature

The engine is rated at an ambient temperature of 25°C (77°F). Minimum ambient temperature for the engine is -32°C (-26°F); maximum ambient temperature is 60°C (140°F).

043.00 Fuel Standards

Only those fuels conforming to the following standards should be used:

ASTM D-975-77 (Grades No. 1-D and 2-D) Diesel

BS 2869: 1970 Class A1 or 1988 Class A2 Diesel

Military JP5 or JP8

Note that Diesel fuel is recommended over JP5 and JP8.

044.00 Engine Serial Number

The engine serial number is stamped on the front upper right side of the engine block (see Figure 4-5).

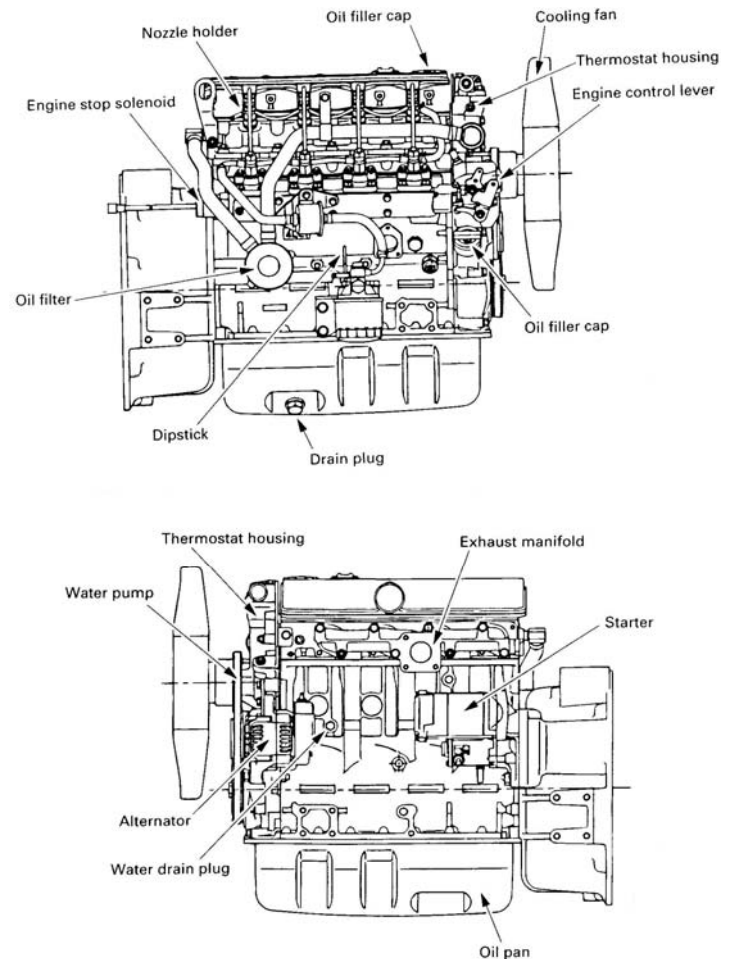


Figure 4-4 - Engine Features

045.00 Alternate Fuels

Although the engine may operate on fuels outside the listed specifications, such operation may result in excessive wear and/or damage. Fuel oil must be a distillate, not a residual oil or blend.

JP-4 is not recommended but may be used in an emergency. Its lubricity is not as good as #1 or #2 Diesel. The engine should be derated by 10% to 15%. Continued use of JP4 will shorten the life of the injection equipment.

	WARNING	DANGER FLAMMABLE LIQUIDS	DIESEL FUEL
DIESEL FUEL IS THE RECOMMENDED FUEL. JP5 OR JP8 MAY BE USED. JP4 IS <u>NOT</u> ADVISED.			

046.00 Fuel Consumption

2.0 GPH of Diesel fuel @ 100% load and 1.5 GPH @ 75% load. Fill tank every 18 hours to prevent possible fuel starvation. The fuel tank capacity is 25 gallons. Under certain conditions, with minimum fluctuating loads, continuous operation for 24 hours is possible with 25 gallons of fuel.

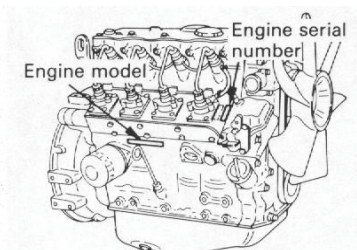


Figure 4-5 - Location of Engine Nameplate

047.00 Lubricating Oil

The engine should be run using heavy duty lubricating oil meeting the requirements of MIL-L-2104C/D, AAPICD Series 3. AAPICC, AAPICE and AAPICF lubricating oils are not recommended. Straight mineral oils are not suitable. Capacity is 8.6 quarts. Do not overfill.

Ambient Temperature	Monograde	Multi-Grade
Below 5°F (–15°C)	5W	5W/20
Between 5°F (–15°C) and 50°F (10°C)	10W	10W/30
Between 40°F (5°C) and 85°F (30°C)	20/20W	10W/30 15W/40
Above 85°F (30°C)	30W	15W/40 20W/40

Table 4-1 - Oil Viscosity Recommendations**048.00 Coolant**

The engine coolant is circulated by a centrifugal pump driven by a V-ribbed belt. The engine coolant capacity is 0.8 gallons. The radiator coolant capacity is 2.3 gallons. Therefore, the total coolant system capacity is 3.1 gallons.

The engine requires a mixture of 40% antifreeze and 60% water under most operating conditions. In extremely hot or cold conditions, the antifreeze concentration can be increased to 60%. The coolant should comply with one of the following specifications:

MIL-A-1 1755 BS6580

MIL-A-46153/B

Anti-freeze, % by volume	Water, % by volume	Coolant Freezing Point	Coolant Boiling Point
40%	60%	-10°F	260°F
50%	50%	-34°F	265°F
60%	40%	-62°F	270°F

Table 4-2 - Coolant Concentrations**END OF WORK PACKAGE**

WP M --- , -- -95151-00 Periodic Engine Maintenance

Periodic maintenance of the engine is necessary and must be part of the routine of operating the UST Trailer. Maintenance activities should be performed at the following periodic intervals:

049.00 Daily Maintenance

Perform a visual walk-around inspection. Follow the Operational Checklist provided at the end of Chapter 4. During the visual walk-around inspection:

1. Fix any fuel, coolant, oil or fluid leaks.
2. Make sure the UST Trailer is properly positioned and level.
3. Make sure the engine exhaust is directed away from personnel and the trailer air intakes.
4. Make sure the UST Trailer is free of debris, inside and outside the enclosures.
5. Make sure airflow to and from the engine is not restricted.
6. Check the lubricating oil.
7. Check the coolant.
8. Check the fire extinguisher.
9. Check the fuel supply and the fuel selector switch.
10. Make sure all enclosure access doors close properly.

050.00 After 50 Hours of Operation

Check the engine air filter element. Clean the dust cap and filter element or replace element if required.

Check the engine fan belt. Adjust tension if required.

Check the fuel filter/agglomerator for water.

051.00 After the first 100 Hours and then every 250 Hours of Operation

Change the lubricating oil and the oil filter.

052.00 Every 500 Hours of Operation

Check all nuts, bolts, fittings and connections. Tighten as required.

Change fuel filter and air filter.

053.00 Every 1000 hours of Operation

Change the fan belt.

Change the engine coolant.

A chart describing Periodic Maintenance and Service can be found at the end of this chapter. Note that procedures for periodic maintenance for the 2000-hour, 6000-hour, and 12000-hour service intervals are not covered in this manual; maintenance at these intervals should be performed by authorized DHS technicians.

Maintenance and service contracts can be arranged with DHS Logistics Co. Parts for maintenance and service can also be obtained from DHS Logistics Co. Please contact DHS for more information.

END OF WORK PACKAGE**DHS SYSTEMS LLC Contact Information**

Phone: 800-977-3647
FAX: 845-365-2114
e-mail: drash@drash.com

WP M --- . -- -95151-00 Engine Maintenance Procedures

054.00 Access to the Engine

The engine is accessed through doors on the forward and rear sides of the Genset enclosure and through a cap on top of the enclosure.

The forward access door must be removed to check oil level, change the oil, or drain coolant from the radiator.

The rear access door must be removed to replace the fan belt, change the fuel filter, change the oil and the oil filter, check coolant, or change the air filter.

The access cap located on the roof of the Genset enclosure must be removed to check and add coolant.

To remove an enclosure access door, release the latches. Allow the access door to come out from the top of the enclosure and lift. Remove the access door.

The access cap is removed by rotating counter-clockwise.

055.00 Checking Lubricating Oil

The engine lubricating oil level should be checked daily, especially before and after operation. The engine dipstick is used to determine the lubricating oil level.

1. The engine must be turned off (to get an accurate oil level indication as well as for safety reasons).
2. Remove the forward access door.
3. Remove the dipstick and wipe clean.
4. Re-insert the dipstick fully and remove. The oil on the dipstick should be between the two marks on the dipstick.
1. Oil should be added if the level is at or below the lower mark. See Section 056.00, below.
2. Close the forward access door.
3. See Section 047.00 of this chapter for recommended oil.

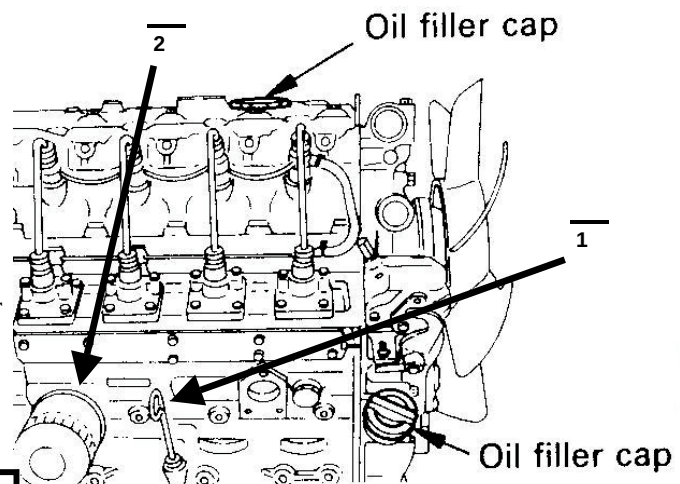
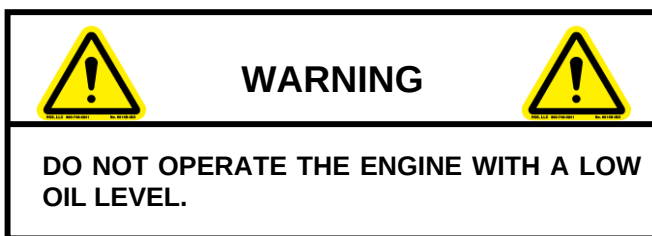


Figure 4-6 - Oil Filler Cap Locations

- 1 – Oil dipstick
2 – Oil filter



056.00 Adding Lubricating Oil

Lubricating oil can be added at the oil filler on the engine block (See Figure 4-6). Oil should be added if the level is at or below the lower mark on the dipstick. See Section 047.00, page 4-4 of this chapter for recommended oil. Add lubricating oil as follows:

1. The engine must be turned off (to get an accurate oil level indication as well as for safety reasons).
2. Open the forward access door.
3. Add oil at the oil filler and re-check the oil level. The oil on the dipstick should be between the two marks on the dipstick.
4. Re-insert the dipstick, secure the oil filler cap and close the enclosure access door.
5. Start the engine and allow the engine to run for a few minutes to circulate the oil. Stop the engine and allow a few minutes for the oil to settle, then re-check the level on the dipstick. Add oil if necessary.
6. When the oil dipstick indicates a proper oil level, re-insert the dipstick and secure the oil filler cap.
7. Wipe off any oil that has spilled, then close the enclosure access door.

057.00 Changing the Lubrication Oil & Oil Filter

The oil filter is a spin-on type cartridge located on the engine block (see Figure 4-4, page 4-3). The lubricating oil and oil filter should be replaced after the first 100 hours of operation and then at every 250-hour interval.

A lubrication oil drain system is provided with each trailer. Removal of the old lubrication oil and replacement of the oil filter is performed as follows:

1. Shut off the engine. Remove both access doors of the Genset enclosure. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
2. Place an oil collection bucket or pan under the oil drain plug. The oil drain plug is located on the right side (curbside), forward of the axle of the trailer frame (see Figure 4-7).
3. Remove the engine oil drain plug.

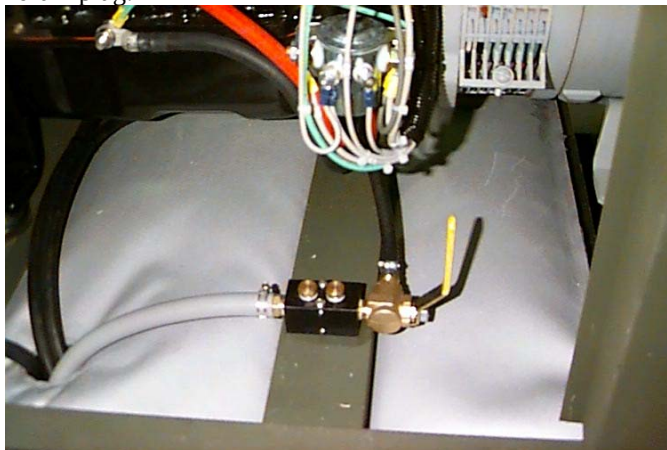


Figure 4-7 - Oil Drain Valve

4. A valve, installed on a hose leading from the oil pan, is provided to regulate oil flow through the hose to the drain port. Turn the valve lever counterclockwise to open the valve. Oil will now run out of the engine, through the hose to the oil drain port. Allow the engine to drain fully.
5. Turn the valve lever clockwise to close the oil drain.
6. Reinstall the drain plug into the drain port. Do not over-tighten.
7. Use a strap wrench to remove the oil filter from the engine. Unscrew the filter from the engine block. Be careful when removing the filter; residual oil can spill from the filter.
8. Lightly lubricate the rubber gasket on the face of the new filter with oil.
9. Screw on the new filter until the rubber gasket makes contact with the crankcase facing. Screw the filter an additional quarter to one-half turn. Hand tighten only.

Add new lubricating oil (approximately 8.6 quarts). See Section 047.00, page 4-4 of this chapter for recommended oil. The oil can be added through either filler location (see Figure 4-6, page 4-6). Replace the filler cap when done. Wipe off any oil that has spilled.

10. Reconnect the battery lead.
11. Start the engine and allow the engine to run for a few minutes to circulate the oil. Check for any leaks. Keep clear of all moving parts.
12. Stop the engine and allow a few minutes for the oil to settle and re-check the level on the dipstick. Add more oil if necessary.
13. Close the enclosure access doors.



NOTE



DISPOSE OF LUBRICATING OIL AND FILTERS IN ACCORDANCE WITH LOCAL REGULATIONS.

058.00 Check & Replace the Air Filter Element

The engine is fitted with a serviceable air filter (see Figure 5-9). The air filter element should be checked at every 50-hour interval and replaced at every 500-hour interval and also as required. In extremely dusty conditions, the air filter should be checked daily.

The air filter element is checked as follows:

1. Shut off the engine. Remove the rear access door. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
2. Release the securing clips on the dust cap and remove the dust cap. This will expose the air filter element, which is removed by rotating and pulling the filter from the housing.
3. Wipe any foreign matter from the inside of the air filter housing and the dust cap. Shake and tap the air filter element to dislodge any dirt and dust; examine it for excessive dirt. Replace if necessary.

IMPORTANT!

DISPOSE OF THE AIR FILTER IN ACCORDANCE WITH LOCAL REGULATIONS.

4. d) Secure the air filter element by aligning the filter with a collar inside the back of the housing.
5. Replace the dust cap and hook the clips on to lip of the cap and snap the clips to the locking position.
6. f) Reconnect the battery lead and close the enclosure access door.



Figure 4-8 - Air Filter Housing & Dust Cap



Figure 4-9 - Air Filter Housing & Air Filter

059.00 Replacing the Fuel Filter

The fuel filter should be replaced at every 500-hour interval as follows:

1. Shut off the engine. Remove the rear access door. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
2. Remove the rear access door. Place a fuel collection bucket or pan under the fuel filter in the event of fuel spillage.
3. Using a strap wrench, unscrew the cartridge from the head.
4. Fill the new cartridge with fuel and lube the mating gasket.
5. Screw in a new cartridge onto the head **until snug**. Turn the cartridge an additional quarter to one-half turn by hand. **Hand tighten only**. Wipe off any fuel that has spilled.
6. Reconnect the battery lead and close the enclosure access doors. Start the engine and check for fuel leaks.

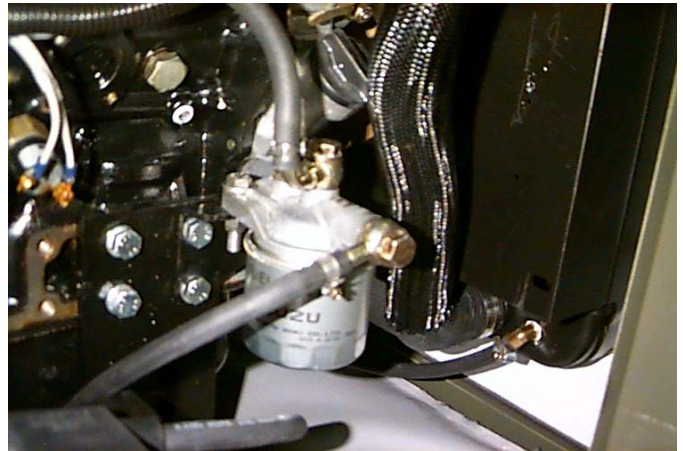


Figure 4-10 - Fuel Filter Location

	WARNING		
DISPOSE OF THE FUEL FILTER IN ACCORDANCE WITH LOCAL REGULATIONS.			

060.00 Checking the Coolant

The engine coolant should be checked daily, especially before and after operation, to ensure that the coolant is at the proper level and has the proper color and consistency. Check the coolant level in the coolant bottle and in the radiator.

1. Shut off the engine. Remove the rear Genset enclosure access door.
2. The bottle should be 1/3 to 1/2 full when the engine is cool.
3. Add coolant from the bottle to achieve the proper level.
4. If the coolant does not have the proper color or consistency, then the coolant should be drained and replaced (see Section 061.00, below).
5. The radiator cap may be accessed by unscrewing the access cap located on the top of the Genset enclosure (see Figure 5-13). Remove the radiator cap. Coolant should be within one inch of the filler neck.
6. If required, fill with coolant through the access cap, using the funnel provided with the trailer. See Section 061.00, for recommended coolant.
7. Close the rear access door and the access cap.

	WARNING	
DO NOT REMOVE RADIATOR CAP IF ENGINE IS WARM. ALLOW ENGINE TO COOL. THE COOLANT IS UNDER PRESSURE. SERIOUS INJURY COULD RESULT.		

061.00 Draining & Replacing the Coolant

Replace the engine coolant every 1000 hours of operation or one year.

1. Shut off the engine.
2. Remove the rear access door.
3. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
4. Place a coolant collection bucket or pan under the coolant drain plug. The coolant drain plug is located at the trailer frame on right side (curbside), forward of the axle (see Figure 4-11).
5. Remove the coolant drain plug.
6. Remove the forward access door and access cap.
7. Remove the radiator filler cap.
8. Two valves are provided to drain coolant from the radiator and engine block through the hose to the drain port. Both valves are located at the base of the radiator drain hose. Both valves must be opened to drain radiator and engine block.
9. Turn the valve levers counter clockwise to the open the valves. Coolant will now run out of the engine block and the radiator through the hose to the drain port.
10. Flush the radiator through the filler with clean water until clean water emerges.
11. Clean the coolant recovery bottle bolted to the side of the radiator.
12. Turn the coolant drain valve levers clockwise to their closed positions.
13. Using the access cap on top of the Genset enclosure, refill the radiator with coolant until the coolant level is one inch below the neck of the radiator. This will require approximately 3.1 gallons of coolant. Use the funnel provided.
14. Wipe off any fluid that has spilled.
15. Screw on the radiator filler cap.
16. Fill the coolant recovery bottle to a level approximately one-third to one-half full.
17. Reconnect the battery lead. Start the engine and allow the engine to run for a few minutes to circulate the coolant. Check for any leaks.
18. Stop the engine and re-check the coolant level in the radiator and the coolant recovery bottle.
19. Add more coolant if required.
20. Close the enclosure access doors and access cap.



Figure 4-13 - Access Cap Located on Roof of Genset Enclosure



WARNINGS



HOT SURFACES

ENGINE AND COOLANT MAY BE HOT.

ALLOW SUFFICIENT COOLING BEFORE ATTEMPTING TO REMOVE RADIATOR CAP AND DRAIN COOLANT.

THE COOLANT IS UNDER PRESSURE.

USE SUITABLE PROTECTIVE EQUIPMENT TO PREVENT PERSONAL INJURIES.

DISPOSE OF ENGINE COOLANT IN ACCORDANCE WITH LOCAL REGULATIONS.

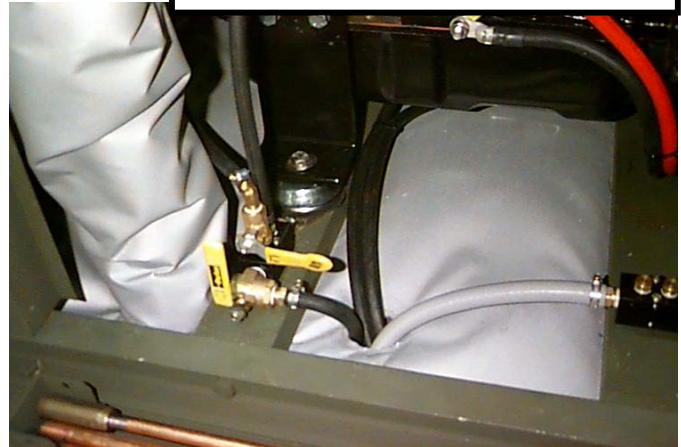


Figure 4-11 - Coolant Valves - Closed



Figure 4-12 - Coolant Valves - Open

062.00 Checking the Engine Fan Belt

The engine fan belt should be checked every 50 hours of operation.

1. Shut off the engine.
2. Remove the rear access door.
3. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
4. Remove the forward access door to get at the belt.
5. Check the belt for worn spots, cracks or signs of fraying. Replace if necessary (see Section 063.00, below).
6. Correct tension allows approximately 3/8 inch of deflection when the belt is pushed inward with thumb pressure exerted midway between the pulleys. If tension is not correct, then adjust the belt per Section 063.00, below.
7. Reconnect the battery lead and close the enclosure access doors.

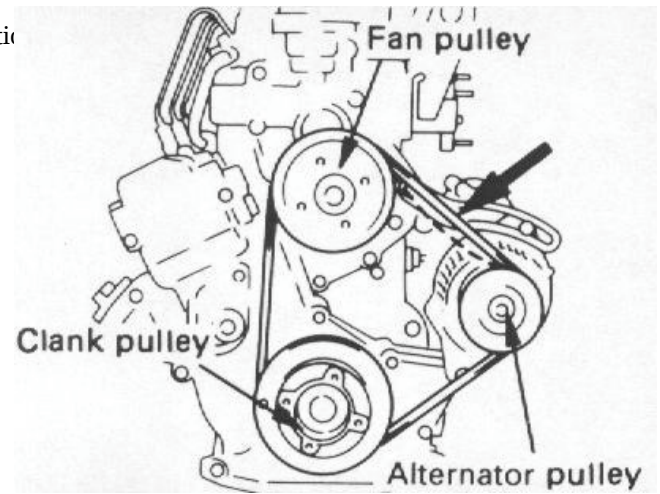


Figure 4-14 - Fan Belt Tension

063.00 Replacing or Adjusting the Engine Fan Belt

The engine fan belt should be replaced at every 500-hour interval or as required. The tension of the fan belt should be adjusted as required.

To replace the fan belt or adjust the fan belt tension:

1. Shut off the engine. Remove the rear access door. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
2. Remove the forward access door to get at the belt.
3. Slightly loosen the bolts shown in Figure 4-15 to allow the alternator to rotate towards or away from the engine block.
4. Replace the belt.
5. Position the alternator so that tension is either increased (away from engine) or decreased (towards engine) as required. Do not over-tighten the belt, as this will cause excessive wear on the engine components.
6. Tighten the bolts.
7. Reconnect the battery lead and close the enclosure access doors.

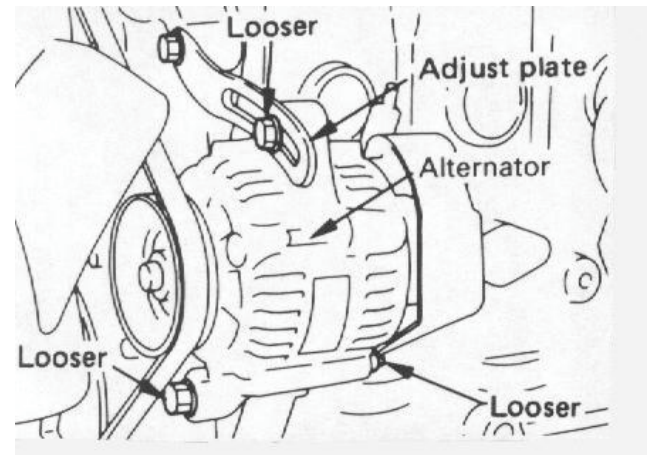


Figure 4-15 - Alternator & Fan Belt Location

END OF WORK PACKAGE

WP G --- -- -95151-00 Generator & Electrical System Characteristics

The generator is a four-pole, single bearing, brushless, self-excited, externally voltage-regulated, synchronous AC generator. The generator is bolted to the engine. Rotary motion generated by the engine is transmitted to the generator by way of a coupling. The generator produces electricity from the rotary motion. The generator is rated at 20 kW at 125°F, providing 120/208 VAC, 60 Hz, three-phase power. The control circuit is 24VDC.

064.00 Generator Serial Number

The generator serial number is stamped on a nameplate attached to the generator.

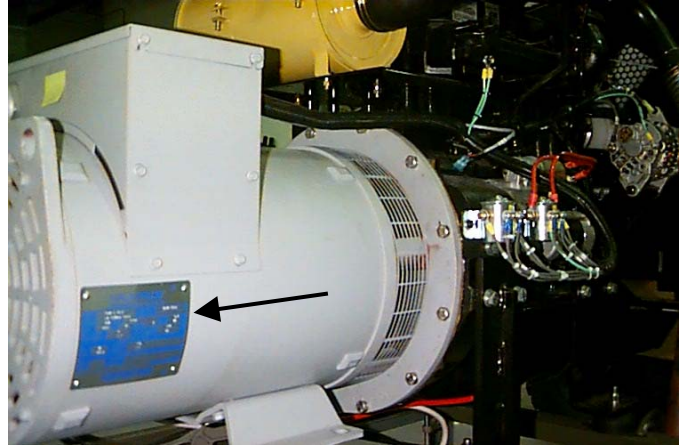


Figure 4-16 - Generator with Nameplate Showing

END OF WORK PACKAGE**WP M --- . -- -95151-00 Periodic Generator & Electrical System Maintenance**

Periodic maintenance of the generator is necessary and must be part of the routine of operating the UST Trailer. Maintenance activities should be performed at the following periodic intervals:

065.00 Daily Maintenance

Perform visual walk-around inspection. Follow the Operation Checklist provided at the end of Chapter 3 (page 3-15). During the visual walk-around inspection:

1. Make sure the UST Trailer is properly positioned and level.
2. Make sure the UST Trailer is free of debris, inside and outside the enclosures.
3. Make sure the generator intake and exhaust air screens are free of debris.
4. Check the ground connection.
5. Check the fire extinguisher.
6. Make sure all enclosure access doors close properly.

066.00 Every 50 Hours of Operation:

1. Check wires and wire connections.
2. Check the batteries.

067.00 Every 250 Hours of Operation:

1. Clean the generator screens

068.00 Every 500 Hours of Operation:

1. Check all nuts, bolts, fittings and connections. Tighten as required.
2. Perform the battery load test.

A chart describing Periodic Maintenance and Service can be found at the end of this chapter. Note that procedures for periodic maintenance for the 2000-hour, 6000-hour, and 12000-hour service intervals are not covered in this manual; maintenance at these intervals should be performed by authorized DHS technicians. Maintenance and service contracts can be arranged with DHS Logistics Co. Parts for maintenance and service can also be obtained from DHS Logistics Co. Please contact DHS for more information.

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END OF WORK PACKAGE

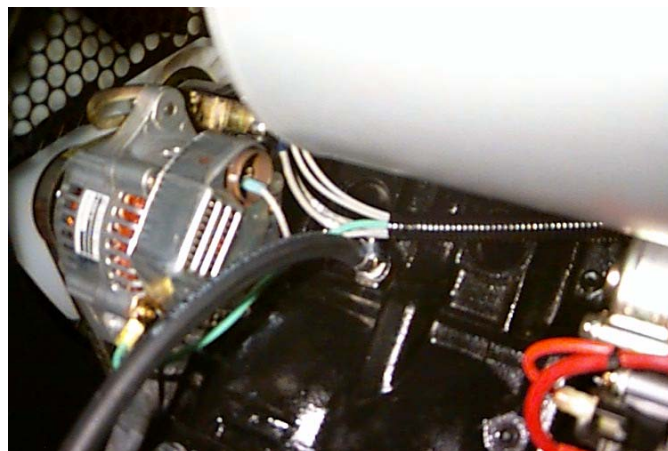
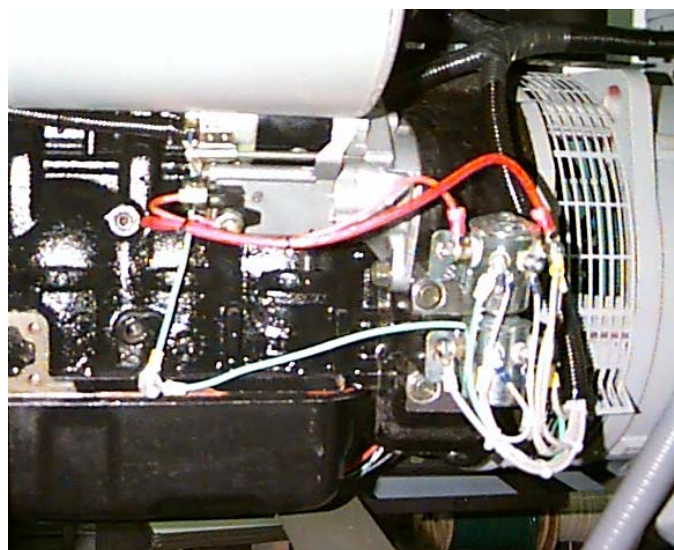
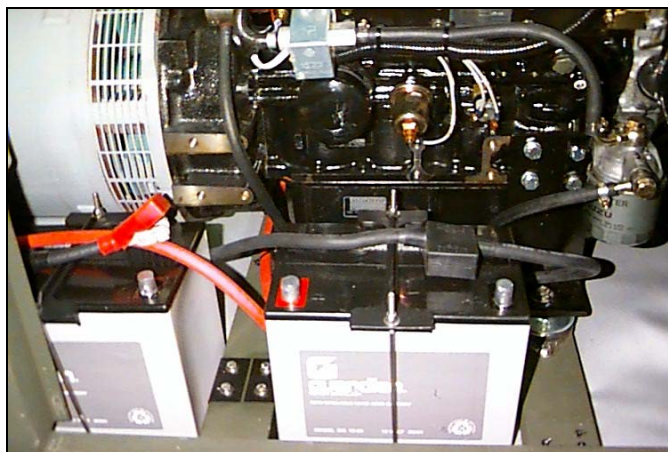
WP M --- , -- -95151-00 Generator & Electrical System Maintenance Procedures**069.00 Access to the Generator**

The generator is accessed through the doors on the forward and rear sides of the Genset enclosure. To remove an enclosure access door, release the latches. Allow the access door to come out from the top of the enclosure and lift. This will release the bottom of the door. Remove the access door.

070.00 Checking Wires & Connections

Check inside the Genset enclosure every 50 hours for broken or frayed wires and loose, discolored, or corroded wire connections.

1. Shut off the engine.
2. Remove the forward and rear access doors of the Genset enclosure.
3. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
4. Inspect all visible connections, including those at the following locations: the generator, the batteries, the solenoids, the alternator and the starter.
5. Replace any broken or frayed wires.
6. Tighten any loose connections.
7. Replace any discolored or corroded connections.
8. Reconnect the battery lead and close the enclosure access doors.

**Figure 4-17 - Alternator Connections****Figure 4-18 - Starter & Solenoid Connections****Figure 4-19 - Battery Connections & Generator Air Screen**

071.00 Cleaning the Generator Air Screen

The generator air screen should be checked daily and cleaned every 250-hour interval.

1. Remove any debris found at the generator intake and exhaust air screens.
2. Clean the air screens with a vacuum. Clogged screens will increase operating temperatures and reduce the generator's life. **Do not use water.**

072.00 Checking the Batteries

The batteries should be checked every 50-hour interval.

1. Check the batteries for cracked or broken cases, corrosion on the terminal posts, damaged or frayed cables, loose connections or any other physical damage.
2. Tighten connections and replace batteries or cables as required.
3. Check the battery status: place the Engine Selector Switch to the run position (without starting) then verify the voltage on the DC Voltmeter on the Genset Instrument Panel. The battery voltage should be between 24 VDC and 28 VDC.
4. If the voltage is above 28 VDC, this may represent a problem with the alternator, refer to Section 074.00, below.
5. If voltage is below 24 VDC, then the battery may not respond to charging and may have to be replaced.

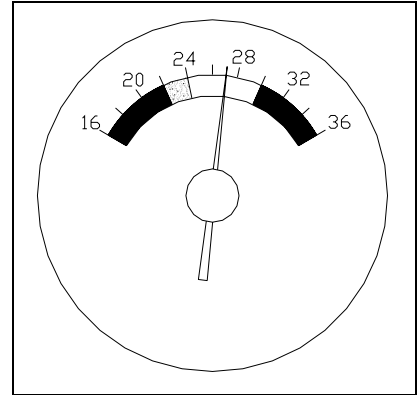


Figure 4-20 - DC Voltmeter



WARNING



THE GENERATOR AND ELECTRICAL SYSTEM SHOULD BE EXAMINED, DIAGNOSED AND REPAIRED BY DHS AUTHORIZED TECHNICIANS ONLY. OPERATOR-LEVEL QUALIFIED PERSONNEL ARE NOT TO ATTEMPT TO REMEDY AN ELECTRICAL PROBLEM. SERIOUS INJURY OR DEATH MAY OCCUR.

Voltage Reading	% of Charge	Action
25 VDC to 28 VDC	75% to 100%	OK
24.5 VDC	50%	Trickle-charge battery.
24 VDC	25%	Trickle-charge battery. There may be an alternator problem.
23 VDC or less	0%	Replace battery.

Table 4-3 - Battery charge levels

073.00 Charging the Batteries

The batteries should be charged as required. See Table 4-3 above. To trickle-charge the batteries:

1. Plug the battery charger cable (provided with the trailer) into the battery charging receptacle (J5) on the Genset Power Distribution Panel. Then connect the opposing end into a 120 VAC power source.
2. Check the indicator lamp and charge the batteries for 8 hours.
3. After 8 hours of trickle charging, the DC Voltmeter should read between 24 VDC and 28 VDC. If not, then repeat the trickle charge for an additional 4 hours.

074.00 Checking the Alternator

To test the alternator:

1. Start the engine.
2. Verify the voltage reading at the DC Voltmeter. The voltage will decrease for 1 to 2 seconds, then it should start to increase above the previous readings. If this occurs, then the alternator is OK.
3. If the reading continues to drop or fails to increase, the alternator is not functioning properly. Call DHS Logistics for a replacement part.
4. If the voltage reading at the DC Voltmeter is above 30 VDC, the alternator is over-charging and needs to be replaced. Call DHS Logistics for a replacement part.

END OF WORK PACKAGE

WP G --- -- -95151-00 Environmental Control Unit Characteristics

The ECU, or Environmental Control Unit, provides either 144,000 BTU/hour (12 tons) of cooling at 120 °F ambient air temperature or 13.5 kW of electrical heating. The ECU is designed to provide cooling or heating of the enclosed space created by deployed shelters over the ambient temperature range of 25 °F to 120 °F.

The ECU is housed in a weatherproof, aluminum enclosure. A thermostatic control that monitors return airflow is used to set and regulate temperatures. A selector switch determines the mode of operation. Airflow is directed to the shelter(s) by way of two 12-inch diameter insulated supply air ducts. Air is returned to the ECU via two 12-inch diameter insulated return air ducts.

Coils and fans are used in converting ambient air to the desired temperature. The coils are constructed of copper tubing with aluminum fins and casing. These fins need to be kept clean to insure high efficiency of the ECU.

The condenser and evaporator fans are belt driven.



WARNING



THE REFRIGERATION SYSTEM CONTAINS GASSES THAT ARE HARMFUL AND SHOULD NOT BE INHALED.

THE REFRIGERATION SYSTEM IN THIS ECU IS HERMETICALLY SEALED.

IT IS IMPORTANT THAT THE SYSTEM BE KEPT SEALED TO PREVENT LOSS OF REFRIGERANT AND TO KEEP AIR AND WATER VAPOR OUT OF THE SYSTEM.

CONTAMINATION BY AIR OR WATER WILL CAUSE EXTENSIVE DAMAGE.

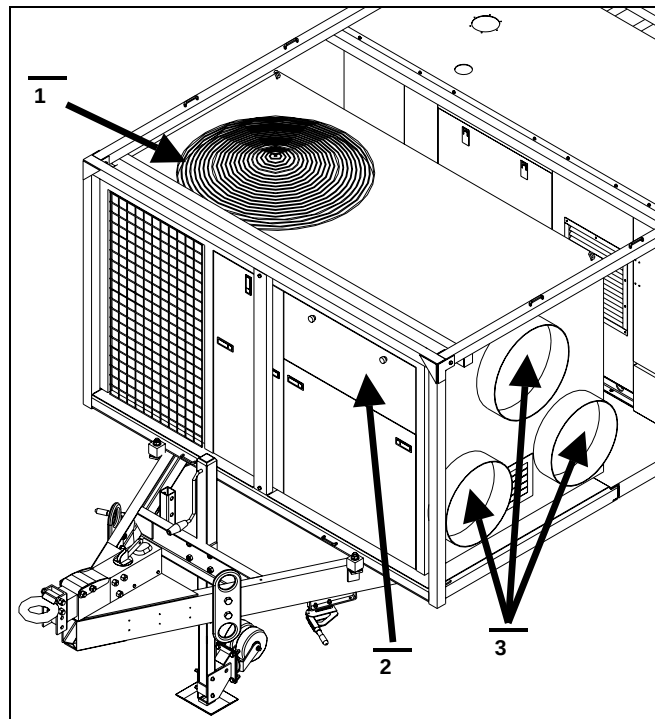


Figure 4-21 - Environmental Control Unit (ECU)

- 1 – Condenser fan
- 2 – ECU control panel
- 3 – Supply and return ports

075.00 ECU Serial Number

The ECU serial number is stamped on a nameplate attached to the ECU.



Figure 4-22 - ECU Nameplate Location

END OF WORK PACKAGE

WP M --- . -- -95151-00 Periodic ECU Maintenance

Periodic maintenance of the ECU is necessary and must be part of the routine of operating the UST Trailer. Maintenance activities should be performed at the following periodic intervals:

076.00 Daily

Perform visual walk-around inspection. Follow the Operation Checklist Chart provided at the end of Chapter 4. During the visual walk-around inspection:

1. Make sure the UST Trailer is properly positioned and level.
2. Make sure the UST Trailer is free of debris, inside and outside the enclosures.
3. Make sure all ECU intake and exhaust air louvers are free of debris, inside and outside the ECU enclosure.
4. Check that the ECU ducts are properly connected and that the duct filters at the shelter ends of the return ducts are in place.
5. Check for water buildup inside the ECU enclosure.
6. Check the condition of the ECU condenser and evaporator fan belts.
7. Check the ECU condenser and evaporator coils.

077.00 Every 50 Hours of Operation:

1. Check the ECU air filters. Clean if required.
2. Check the condenser and evaporator fan belts. Adjust tension if required.

078.00 Every 250 Hours of Operation:

1. Clean the ECU condenser and evaporator coils.

079.00 Every 500 Hours of Operation:

1. Check all nuts, bolts, fittings and connections. Tighten as required.
2. Check the condenser fan bearings. Lubricate as required.
3. Check the evaporator fan bearings. Lubricate as required.

080.00 Every 1000 hours of Operation:

1. Change the condenser and evaporator fan belts.

A chart describing Periodic Maintenance and Service can be found at the end of this chapter. Note that procedures for periodic maintenance for the 2000-hour, 6000-hour, and 12000-hour service intervals are not covered in this manual; maintenance at these intervals should be performed by authorized DHS technicians.

Maintenance and service contracts can be arranged with DHS Logistics Co.

Parts for maintenance and service can also be obtained from DHS Logistics Co.

Please contact DHS for more information.

END OF WORK PACKAGE**DHS SYSTEMS LLC Contact Information**

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WP M --- , -- -95151-00 Routine ECU Maintenance Procedures

081.00 Access to the ECU

The ECU is accessed by removing all four ECU enclosure doors.

To remove an enclosure access door, release the latches. Allow the access door to come out from the top of the enclosure and lift. This will release the bottom of the door. Remove the access door.

082.00 Checking Duct Connections & Filters

The ECU duct connections and return duct filters should be checked daily, especially before operation, for proper installation. Remove any debris collected on the duct filters.

083.00 Checking for Water Buildup in the ECU Enclosure

Check daily for condensation and rain water that may build up inside the ECU enclosure. It is important to remove this water. There are two drain ports on the bottom of the ECU (see Figure 4-23).

Make sure they are not clogged.

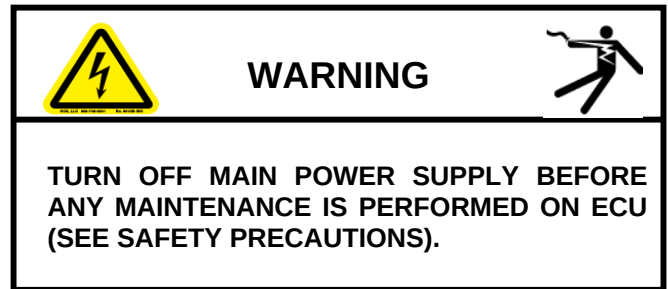


Figure 4-23 - One of Two Drain Ports

084.00 Checking & Cleaning the ECU Air Filters

The ECU air filter(s) should be inspected every 50 hours of operation. Depending on the model of the ECU, there may be one type of filter or there may be two (coarse and fine; see Figure 4-24).

1. Clean as necessary.
2. Turn the ECU Selector Switch to the OFF position.
3. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel. Shut off the engine.
4. Remove the rear access door of the Genset enclosure.
5. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries. Remove the two roadside access doors on the ECU enclosure.
6. Check condition of air filters. If dirty, clean with warm water and allow to dry before putting back inside the enclosure.
7. Reconnect the battery lead and close the Genset and ECU enclosure access doors.

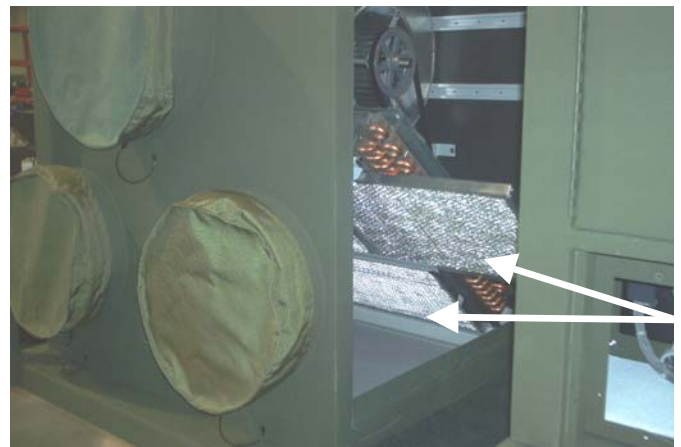


Figure 4-24 - ECU Air Filters

085.00 Checking the Condenser & Evaporator Fan Belts

The ECU condenser fan belt and the evaporator fan belt should be checked every 50 hours of operation.

1. Turn the ECU Selector Switch to the OFF position.
2. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel.
3. Shut off the engine.
4. Remove the rear access door of the Genset enclosure.
5. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
6. Open all of the access doors on the ECU.
7. Check the belts for worn spots, cracks or signs of fraying. Replace if necessary (see Section 5.3.6 below).
8. Check the tension of the condenser fan belt. Correct tension is indicated by a deflection of approximately 5/8 inch when the belt is pushed inward with thumb pressure exerted midway between the pulleys. If the condenser fan belt tension is not correct, adjust per Section 086.00, below.
9. Check the tension of the evaporator fan belt. Correct tension is indicated by a deflection of approximately 3/4 inch when the belt is pushed inward with thumb pressure exerted midway between the pulleys. If the evaporator fan belt tension is not correct, adjust per Section 086.00, below.
10. Make sure the pulleys and the shafts are in good condition. Rotating parts should be clean and rust free. The shaft keys should be securely seated between the shaft and the pulley.
11. Reconnect the battery lead and close the Genset and ECU enclosure access doors.

086.00 Replacing or Adjusting the ECU Condenser Fan & Evaporator Belts

The ECU condenser fan belt and the evaporator fan belt should be replaced at every 1000-hour interval. The tensions of the ECU belts should be adjusted as required.

1. Turn the ECU Selector Switch to the OFF position.
2. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel.
3. Shut off the engine.
4. Remove the rear access door of the Genset enclosure.
5. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
6. Remove all the access doors of the ECU enclosure.

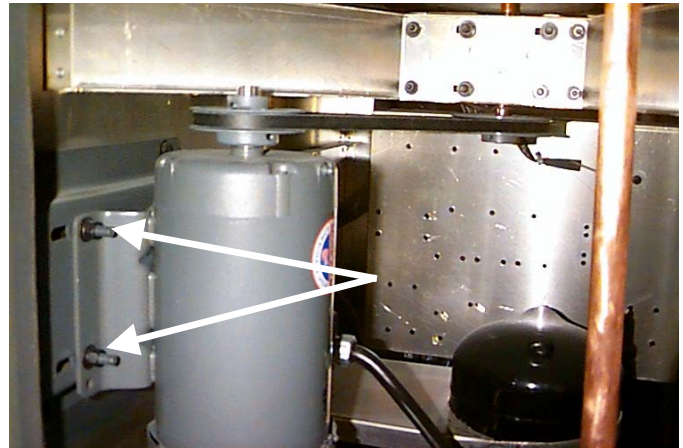


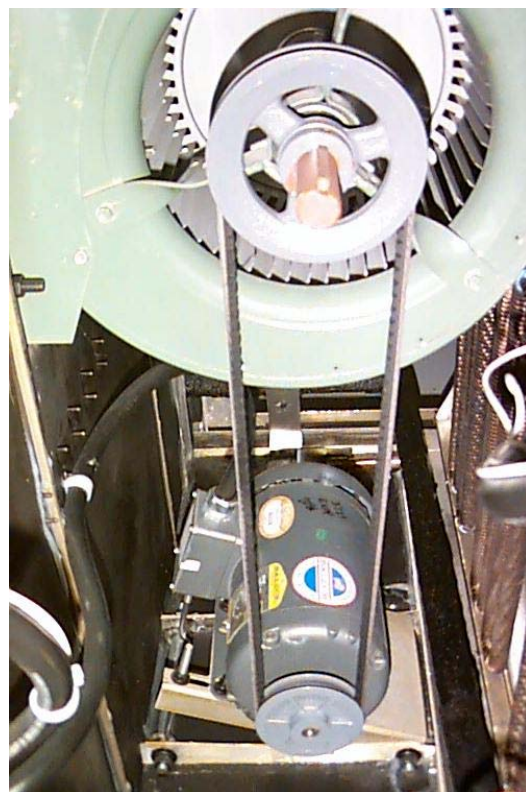
Figure 4-25 - ECU Condenser Motor & Fan Belt

7. To replace the condenser fan belt, slightly loosen the four nuts (only two are showing in Figure 4-25; see arrows) that hold the condenser motor to the motor mount. This will allow the motor to slide. Slide the motor towards the other pulley. The fan belt will slacken and can be removed and replaced.
8. To adjust the condenser fan belt tension, loosen the condenser motor as described above and pull the condenser motor toward or away from the enclosure opening until the belt is taut (but not excessively tight). Then tighten the four loose nuts to secure the motor in place. Check the belt tension (see 085.00, above).

Continued

9. To replace the evaporator fan belt, loosen the two top nuts on the threaded rods of the adjustable evaporator motor mount (see arrows in Figure 4-27). This will allow the motor to rotate clockwise.
10. Continue to loosen those two nuts. When there is enough slack in the belt, it may be removed and replaced.
11. To adjust the evaporator belt tension, loosen the two top nuts on the threaded rods of the adjustable evaporator motor mount. This will allow the motor to rotate clockwise.
12. Rotate the two lower nuts (lower to increase tension, higher to lessen tension). Allow the motor mount to rest back on the two lower nuts and secure with the two top nuts.
13. Repeat, if necessary, to get the right tension per Section 5.3.5.
14. Reconnect the battery lead and replace the Genset and ECU enclosure access doors.

Figure 4-26 - ECU Evaporator Motor & Fan Belt

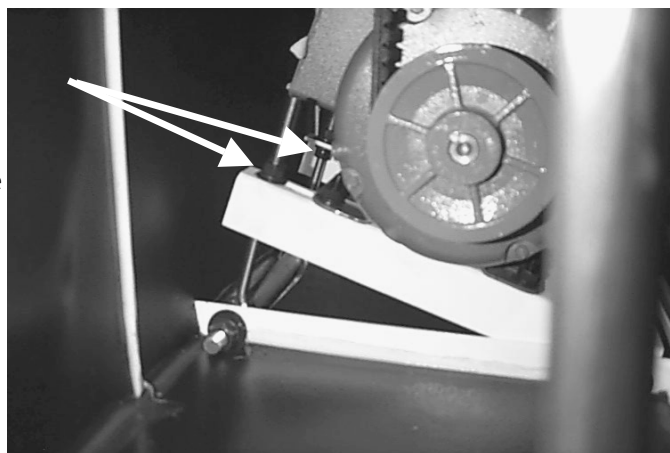


087.00 Checking & Cleaning the Condenser & Evaporator Coils

The coils must be checked daily and cleaned every 250 hours or as required to perform efficiently.

1. a) Turn the ECU Selector Switch to the OFF position. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel. Shut off the engine. Remove the rear access door of the Genset enclosure. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.

Figure 4-27 - Evaporator Motor Mount with Locking Nuts



2. b) Remove the two curbside access doors of the ECU enclosure.
3. Check the coils for dirt and blockage.
4. Clean the condenser and evaporator coils with a vacuum or backwash with compressed air. For severe dirt, use a heavy-duty detergent for spray cleaning the coils. Follow instructions on the cleaner container for best results.

continued

	NOTES	
WEAR APPROVED PERSONAL PROTECTIVE EQUIPMENT (GOGGLES/FACE SHIELD) WHEN USING COMPRESSED AIR. DO NOT DIRECT AIR STREAM TOWARDS ONESELF OR OTHER PERSONNEL.		
AIR PRESSURE SHOULD BE RESTRICTED TO LESS THAN 30 PSI.		

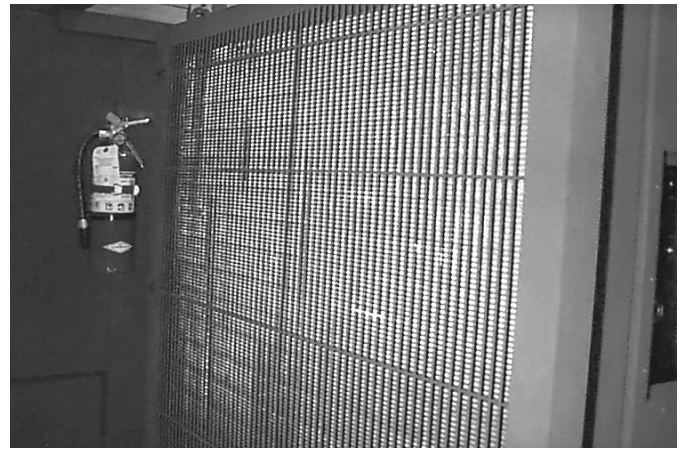
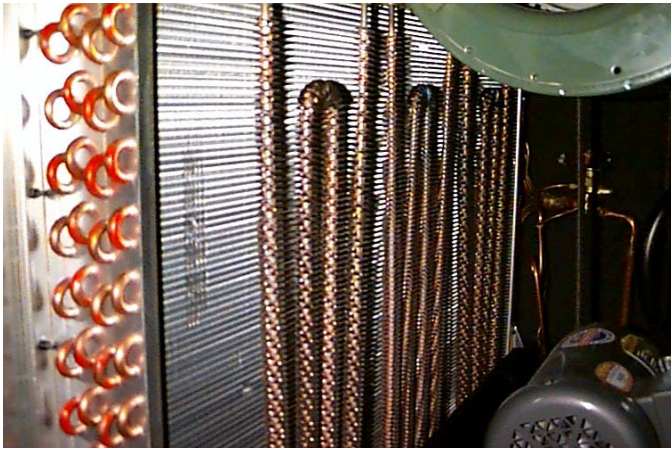


Figure 4-28 - Evaporator Coils (left) & Condenser Coils (right)

5. Reconnect the battery lead and replace the Genset and ECU enclosure access doors.

088.00 Checking & Lubricating the Condenser Fan Pillow Block Bearings

Check the condenser pillow block bearings every 500 hours of operation under normal operating conditions.

The condenser fan pillow block bearings have been pre-lubricated. However, extended operation in high ambient temperatures and/or dusty and dirty air may require checking and re-lubrication every 250 hours. Operating in exceptionally hot and dirty environments may require checking and lubricating the bearings every 50 hours.

1. Turn the ECU Selector Switch to the OFF position.
2. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel.
3. Shut off the engine. Remove the rear access door of the Genset enclosure.
4. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
5. Remove the two curbside access doors of the ECU enclosure.
6. To inspect the condenser fan bearings, place a thumb and forefinger on either side of one bearing.
7. Pull the fan belt slowly (see Figure 4-29) to rotate the shaft.
8. Listen and feel for clicking or grinding. If either is present, the bearing will need to be replaced.
9. Contact DHS Logistics for a replacement part.

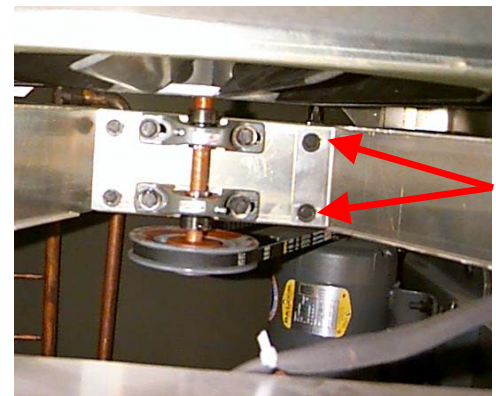


Figure 4-29 - Condenser Fan Pillow Block Bearings

10. To lubricate the bearing, connect a grease gun to the grease fitting on the side of the bearing.
11. Insert a very small amount of standard lithium soap grease into the bearing. Both excessive lubrication and under lubrication may lead to early failure.
12. Reconnect the battery lead.
13. Replace the Genset and ECU enclosure access doors.

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089.00 Checking the Evaporator Fan Bearings

Check the evaporator fan bearings every 500 hours of operation. The evaporator fan bearings are pre-lubricated and sealed. They cannot be re-lubricated. Extended operation in high ambient temperatures and/or dusty and dirty air may require checking every 250 hours.

1. Turn the ECU Selector Switch to the OFF position.
2. Turn off the Power Selector Switch and all circuit breakers on the Genset Power Control Panel.
3. Shut off the engine.
4. Remove the rear access door of the Genset enclosure.
5. Disconnect the batteries by disconnecting the negative (black) lead on one of the batteries.
6. Remove the two roadside access doors of the ECU enclosure.
7. To inspect the evaporator fan bearings, place a thumb and forefinger on either side of one bearing.
8. **Slowly** pull the fan belt (see Figure 4-30) to allow the shaft to rotate.
9. Listen and feel for clicking or grinding. If either is present, the bearing will need to be replaced.
10. Contact DHS Logistics for a replacement part.
11. Reconnect the battery lead and replace the Genset and ECU enclosure access doors.

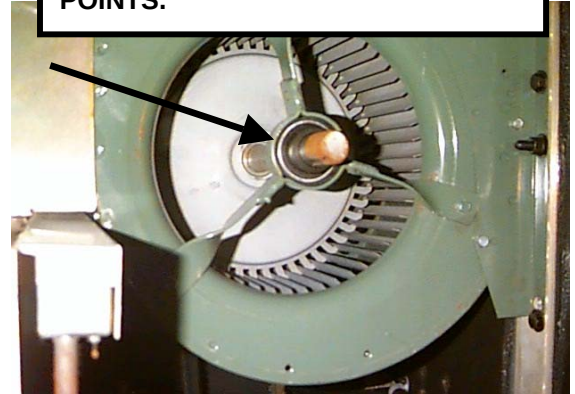
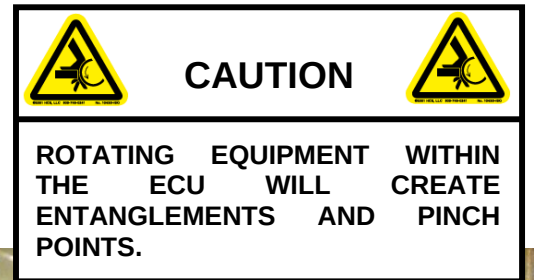


Figure 4-30 - Evaporator Fan Bearing

END OF WORK PACKAGE

WP M --- . -- -95151-00

Periodic Maintenance Table

Item	Maintenance Interval					
	Daily	Every 50 hours	Every 250 hours	Every 500 hours or 6 months *	Every 1000 hours or 12 months *	Every 2000 hours or 24 months *
Perform visual walk-around inspection.	•	•	•	•	•	•
Fix any fuel, coolant, oil or fluid leaks.	•	•	•	•	•	•
Make sure the UST Trailer is properly positioned and level.	•	•	•	•	•	•
Make sure the engine exhaust is directed away from personnel and the trailer air intakes.	•	•	•	•	•	•
Make sure the UST Trailer is free of debris, inside and outside the enclosures.	•	•	•	•	•	•
Make sure airflow to and from the engine is not restricted.	•	•	•	•	•	•
Make sure the generator intake and exhaust air screens are free of debris.	•	•	•	•	•	•
Make sure all ECU intake and exhaust air louvers are free of debris, inside and outside the ECU enclosure.	•	•	•	•	•	•
Check that the ECU ducts are properly connected and that the duct filters at the shelter ends of the return ducts are in place.	•	•	•	•	•	•
Check the ground connection.	•	•	•	•	•	•
Check the lubricating oil.	•	•	•	•	•	•
Check the coolant.	•	•	•	•	•	•
Check for water buildup in the ECU enclosure.	•	•	•	•	•	•
Check the ECU condenser and evaporator fan belts.	•	•	•	•	•	•
Check the ECU condenser and evaporator coils.	•	•	•	•	•	•
Check the fire extinguisher.	•	•	•	•	•	•
Check the tires for proper tire pressure.	•	•	•	•	•	•
Check the fuel supply and the fuel selector switch.	•	•	•	•	•	•
Make sure all enclosure access doors close properly.	•	•	•	•	•	•
Check the engine air filter element. Clean or replace if required.**		•	•	•	•	•
Check the engine fan belt. Adjust tension if required.		•	•	•	•	•
Check the fuel filter/agglomerator. Drain any water.		•	•	•	•	•
Check for broken or frayed wires. Check for loose, discolored, or corroded connections.		•	•	•	•	•

Item	Maintenance Interval					
	Daily	Every 50 hours	Every 250 hours	Every 500 hours or 6 months *	Every 1000 hours or 12 months *	Every 2000 hours or 24 months *
Check the batteries.		•	•	•	•	•
Check the ECU air filters. Clean if required.		•	•	•	•	•
Check the ECU condenser and evaporator fan belts. Adjust tension if required.		•	•	•	•	•
Change the lubricating oil and the oil filter.***			•	•	•	•
Check the surge brake fluid.			•	•	•	•
Check the parking brakes.			•	•	•	•
Lubricate the tongue jack.			•	•	•	•
Clean the ECU condenser and evaporator coils.			•	•	•	•
Change the fuel filter and the air filter element.				•	•	•
Check all nuts, bolts, fittings and connections. Tighten as required.				•	•	•
Wash the trailer and the enclosures.				•	•	•
Check the ECU condenser fan pillow block bearings.				•	•	•
Check the evaporator fan bearing.				•	•	•
Change the engine fan belt.					•	•
Change the ECU condenser and evaporator fan belts.					•	•
Flush the cooling system and replace the coolant.					•	•
Decarbonize the engine.						•
Drain and clean the fuel tank.						•
Repack the wheel bearings.						•
Check the brake shoes. Replace if required.						•
Replace the fuel lift pump diaphragm.						•
Check the fuel injector nozzles. Clean or replace if required.						•
Replace the engine coolant hoses.						•
Notes * Whichever comes first. ** Check the engine air filter element daily if operating in very dusty conditions. *** Change the oil for the first time after 100 hours maximum of operation, then every 250 hours thereafter.						

Table 4-4 - HP-4DL Periodic Maintenance

END OF WORK PACKAGE

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5. TROUBLESHOOTING

5.1 General Troubleshooting Information

The following chapter contains general information for troubleshooting by operator-level qualified personnel. A qualified person is one who is familiar with this manual, the operation of the Model HP-4DL UST Trailer and the hazards involved in its operation and maintenance and who has been certified by the DHS Training program.

We strongly recommend that operators receive training directly from a DHS Product Support or Field Service Representative.

This chapter provides a systematic approach to locating and correcting malfunctions of the utility trailer. Each section is arranged according to the symptoms of a problem.

The action items have been arranged in order of complexity, with simpler actions listed first. Note that troubleshooting causes and actions beyond the scope of operator-level qualified personnel are not included in this manual. If a course of action does not present itself, call DHS.

The most important step of troubleshooting is to gather as much first-hand information as possible from the personnel who were present when the problem or failure occurred. Information as to how long the unit had been operating, what loads were on-line, what the weather conditions were, whether any protective equipment or device functioned, etc., can also help isolate a problem.

Note that many of the procedures listed in the Action column below require going inside the Genset or ECU enclosure. A number of these procedures are described in Chapter 5. Do not forget to turn off all switches and circuit breakers and disconnect the batteries when required.

If in any doubt about how to proceed, contact DHS before taking action (phone: 800-977-3647, fax: 845-365-2114 or e-mail: drash@drash.com). Please have available the Vehicle Identification Number (VIN) of the trailer in question.



NOTES



TOOLS, EQUIPMENT, CLOTHING AND YOUR BODY MUST BE KEPT CLEAR OF ROTATING PARTS AND ELECTRICAL CONNECTIONS.

SPECIAL CAUTION MUST BE TAKEN DURING TROUBLESHOOTING SINCE PROTECTIVE COVERS AND SAFETY DEVICES MAY BE REMOVED OR DISABLED TO GAIN ACCESS AND MAKE TESTS.

BE CAREFUL! SERIOUS PERSONAL INJURY OR DEATH CAN RESULT FROM THE HAZARDS INVOLVED IN THE OPERATION AND MAINTENANCE OF THE TRAILER. CONSULT DHS WITH ANY QUESTIONS BEFORE TAKING ACTION.

DHS SYSTEMS LLC Contact Information

Phone: 800-977-3647
FAX: 845-365-2114
e-mail: drash@drash.com

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Trailer Chassis Troubleshooting Procedures

Symptom	Cause	Action
090.00 Drips Or Leaks	Loose connection	Tighten connection.
	Broken hose, tubing or line	Call DHS.
091.00 Mechanical Parking Brake Does Not Work	Incorrect tension adjustment	Reset tension with hand knob.
	Broken brake cable	Call DHS.
092.00 Surge Brake Does Not Work	Breakaway lever has snapped over leaf spring (see Chapter 3, Figure 3-10)	Set the breakaway lever to the fully-released position.
	Dirty, cloudy or watery brake fluid	Drain and replace brake fluid. Call DHS.
	Broken hydraulic tubing	Call DHS.
	Improperly adjusted or worn brake shoes	Call DHS.
093.00 Tail Light Does Not Work	Bad bulb	Replace bulb.
	Improper connection to tow vehicle or to tail light assembly	Disconnect, then reconnect. Replace connection if necessary.
	Broken wire	Repair.

END OF WORK PACKAGE

WP T --- . -- -95151-00

Engine Troubleshooting Procedures

Symptom	Cause	Action
094.00 Engine Does Not Crank	Low battery voltage or dead battery	Check battery connections. Check battery voltage. Recharge battery or replace if required.
095.00 Engine Cranks But Does Not Start	No fuel	Check fuel tank and fuel selector switch.
	Air in fuel line	Bleed fuel line.
	Clogged fuel filter.	Drain any water from the fuel filter/agglomerator. Inspect filter. Replace fuel filter if required..
	Improper type of fuel.	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill with proper fuel and bleed fuel line.
	Water, dirt or air in fuel system.	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill with proper fuel and bleed fuel line.
	Fuel actuator fails to move to full fuel position	Check battery voltage. Examine wiring back to the battery. Jiggle the actuator. Replace actuator if required. Call DHS.

Symptom	Cause	Action
096.00 Engine Cranks But Does Not Start Below 32°F	Improper type of fuel.	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill with proper fuel and bleed fuel line.
	High engine oil viscosity.	Change oil and oil filter. Use proper oil.
	Low battery voltage	Recharge battery.
097.00 Engine Stops	No fuel	Check fuel tank and fuel selector switch.
	Overspeed condition	Check fuel level and fuel type.
	High coolant temperature	See "ENGINE OVERHEATS" below.
	Low lubricating oil pressure.	Use proper lubricating oil or add oil to proper level.
	Overloaded engine	Reduce load.
	Water, dirt and/or air in fuel system.	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill with proper fuel and bleed fuel line.
	Clogged air filter element or fuel filter.	Check air filter element and fuel filter. Replace if required.
098.00 Engine Overheats	Overloaded engine	Reduce load.
	Re-circulated exhaust gas or engine air	Re-position trailer. Add exhaust extension. Re-position exhaust extension.
	Obstructed air inlets or exhausts	Clear inlets and exhausts, especially the radiator fan inlet.
	Improper engine fan belt tension.	Adjust engine fan belt tension.
	Worn engine fan belt	Replace engine fan belt.
	Low lubricating oil level	Add lubricating oil.
	Low coolant level	Add coolant.
	Old or contaminated coolant	Drain, flush and replace coolant.
	Water in fuel	Drain fuel filter/agglomerator.
	Blocked radiator cooling fins	Clean radiator fins.
	Contaminated fuel	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill with proper fuel and bleed fuel line.

Symptom	Cause	Action
099.00 Engine Emits An Excessive Amount Of White Smoke	Water in combustion chamber	Call DHS.
0100.00 Engine Emits Faint Blue Smoke	Under-loaded engine	Turn on ECU heating or cooling. Increasing the load reduces the possibility of wetstacking. See Symptom 0103.00 below.
	Incorrect injection timing or defective injectors.	Call DHS.
0101.00 Engine Emits Heavy Blue Smoke	Overfill of lubrication oil	Check oil level. Drain to proper level.
	High lubricating oil viscosity	Change oil and oil filter. Use proper oil.
	Stuck, worn or broken piston rings	Call DHS.
	Worn cylinder bore	Call DHS.
0102.00 Engine Emits Black Smoke	Overloaded engine	Reduce load.
	Clogged air filter	Check air filter. Replace air filter element if required.
	Water in fuel	Drain fuel filter/agglomerator.
	Improper or contaminated fuel	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill and bleed.
	Defective injectors	Call DHS.
0103.00 Excessive Carbon Deposits Form On The Exhaust Tail Pipe	Blocked or obstructed exhaust system	Clear exhaust system.
	Clogged air filter element	Check air filter element. Replace if required.
	Improper fuel	Drain fuel tank and purge fuel lines. Replace fuel filter. Fill and bleed.
	Improper lubrication oil	Change oil and oil filter. Use proper oil.
	Wet stacking – the build up of unburned diesel fuel and carbon residues in the engine and exhaust system of diesel engines, evidenced by increased vibration and carbon deposits on the tail pipe.	Load generator to over 50% of full load for 4 hours.

END OF WORK PACKAGE

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Generator & Electrical System Troubleshooting Procedures

**WARNING**

THE GENERATOR AND ELECTRICAL SYSTEM SHOULD BE EXAMINED, DIAGNOSED AND REPAIRED BY DHS AUTHORIZED TECHNICIANS ONLY.

OPERATOR-LEVEL QUALIFIED PERSONNEL SHOULD NOT GO BEYOND THE ACTION ITEMS SUGGESTED HERE; THEY MUST **NOT** ATTEMPT TO REMEDY AN ELECTRICAL PROBLEM WITHOUT FIRST GETTING INSTRUCTION FROM A DHS AUTHORIZED TECHNICIAN.

FAILURE TO HEED THIS WARNING MAY VOID THE WARRANTY.

SERIOUS INJURY AND DEATH MAY OCCUR.

IF IN ANY DOUBT ABOUT HOW TO PROCEED, CALL DHS.

Symptom	Cause	Action
0104.00 Generator Produces No Voltage	Switched-off circuit breaker CB5	Switch circuit breaker to the ON position.
	Switched-off Ammeter Voltmeter Selector Switch	Check to be sure selector switch is not in the OFF position.
	Blown fuse; incorrect electrical connections; inoperative voltmeter, voltage regulator or generator	Contact DHS.
0105.00 Generator Produces Low Voltage Under No Load	Underspeed operation; incorrect electrical connections; inoperative voltmeter, voltage regulator or generator	Contact DHS.
0106.00 Generator Produces Low Voltage When Load Is Applied	Overload	Check watt meter and verify that the load does not exceed 35kW.
	Unbalanced load.	Balance loads and verify using the Ammeter Voltmeter Selector Switch (current for any leg should not exceed 60 amps).
	Inoperative watt meter, ammeter, voltage regulator or main rotor	Contact DHS.
0107.00 Generator Produces High Voltage Under No Load	Incorrect operating speed, incorrect electrical connections, inoperative voltmeter or inoperative voltage regulator	Contact DHS.

0108.00 Generator Produces High Voltage When Load Is Applied	Unbalanced load.	Balance loads and verify balance using the Ammeter Voltmeter Selector Switch (current for any leg should not exceed 60 amps).
	Inoperative voltage regulator	Contact DHS.
0109.00 Generator Voltage Is Fluctuating	Incorrect speed	Contact DHS.
	Unstable speed	Contact DHS.
	Unstable voltage	Contact DHS.
	Defective potentiometer	Contact DHS.
0110.00 Generator Builds Voltage From Start-Up, Then Goes To Low Voltage	Inoperative voltage regulator	Contact DHS.
0111.00 Equipment Runs Normally on Shore Power but not On Gen Power	Incorrect generator voltage and/or frequency.	Check generator output voltage and frequency. Compare to shore power. Adjust generator voltage with potentiometer if required. Call DHS.

END OF WORK PACKAGE**WP T --- . -- -95151-00****Voltage Regulator Troubleshooting Procedures**

Symptom	Cause	Action
0112.00 No Output Voltage	Blown fuse or inoperative voltage regulator	Contact DHS.
0113.00 Output Voltage Low	Voltage adjustment turned down	Rotate potentiometer CW until desired voltage is reached.
	Inoperative voltage regulator	Contact DHS.
0114.00 Output Voltage High	Voltage adjust too high	Rotate potentiometer CCW until desired voltage is reached.
	Inoperative voltage regulator	Contact DHS.
0115.00 Generator Output Voltage Hunting	Inoperative voltage regulator	Contact DHS.

END OF WORK PACKAGE

WP T --- . -- -95151-00

ECU Troubleshooting Procedures

Symptom	Cause	Action
0116.00 ECU Will Not Start	Power to unit is interrupted at source.	Re-establish power at source.
	Power Selector Switch set improperly	Set switch to proper source.
	Switched-off circuit breakers CB1 or CB5	Switch circuit breaker(s) to the ON position.
	Wiring from shore power source broken or loose at terminals	Replace or repair. Tighten loose terminals.
	ECU not phased correctly (red Phase Indicator Lamp comes on) while running on shore power	Qualified electrical personnel should rotate any two incoming shore power wires.
0117.00 Conditioned Air Too Cool	Thermostat improperly set.	Reset to proper temperature.
	ECU Selector Switch on wrong setting	Check ECU Selector Switch.
0118.00 Conditioned Air Too Warm	Thermostat improperly set	Reset to proper temperature.
	ECU Selector Switch on wrong setting	Check ECU Selector Switch.
	Clogged air filters	Check air filters. Clean if required.
	Iced evaporator coil	Check coil. Defrost if required. Also check air filters.
	Inoperative condenser fan motor, evaporator fan motor or thermostat	Contact DHS.
0119.00 Compressor Short-Cycles	Dirty or iced evaporator coil; reduced air flow	Clean and defrost evaporator coil. Clean air filters. Contact DHS if symptom persists.

END OF WORK PACKAGE

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Section 6

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6. HP 4 DL SYSTEM PARTS LISTS

WP R ---,-- -95151-00

Possible Spare Parts for Trailer Chassis

Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
1	Tail Light, Military	T20001C	2	1	1
2	Complete Brake Assembly, Right Side, incl.	T20002CR	1	1	-
	Backing Plate Ass'y, Brake & Shoe Lining,				
	Brake Cylinder, Retractor Spring, Parking				
	Brake Bracket and associated hardware				
3	Complete Brake Assembly, Left Side, incl.	T20002CL	1	1	-
	Backing Plate Ass'y, Brake & Shoe Lining,				
	Brake Cylinder, Retractor Spring, Parking				
	Brake Bracket and associated hardware				
4	Dolly Wheel	T20003C	1	-	-
5	Cotter Pin	T20004C	2	2	-
6	Grease Cap	T20005C	2	1	-
7	Grease Seal	T20006C	2	1	-
8	Hose Hydraulic Kit	T20007C	-	1	-
9	Bearing Cone, Inner	T20008C	2	-	-
10	Bearing Cone, Outer	T20009C	2	-	-
11	Bearing Cap, Inner	T20010C	2	-	-
12	Bearing Cap, Outer	T20011C	2	-	-
13	Brake & Shoe Lining Kit, LH	T20012C	1	-	-
14	Brake & Shoe Lining Kit, RH	T20013C	1	-	-
15	Cylinder Brake, LH	T20014C	1	-	-
16	Cylinder Brake, RH	T20015C	1	-	-
17	Spindle Nut	T20016C	2	-	-
18	Spindle Washer	T20017C	2	-	-
19	Lug Nut	T20018C	16	2	2
20	Retractor Spring	T20019C	2	-	-
21	Reflector, Red *	T20020C	4	1	1
22	Reflector, Amber *	T20021C	2	1	1
23	Gear Assembly Repair Kit, Tongue Jack	T20023C	-	1	1
24	Assembly / Extension Pin, Tongue Jack	T20024C	3	1	1
25	Bulb, 24V, Large, Tail Light	T260315	2	1	1

Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
26	Bulb, 24V, Panel or Tail Light	T260305	4	2	2
27	Coupler Surge Brake	PCHA0120	1	-	-
28	Master Cylinder, Surge Brake	PCHA0121	1	1	-
29	Link, Surge Brake	PCHA0122	2	-	-
30	Shaft, Surge Brake	PCHA0123	2	-	-
31	Nylon Bushing, Surge Brake	PCHA0124	4	-	-
32	Self-Locking Nut, Surge Brake	PCHA0125	4	-	-
33	Shock Absorber, Surge Brake	PCHA0126	1	-	-
34	Brake Line Kit	PCHA0127	1	-	-
35	Brake Line Adapter	PCHA0128	1	-	-
36	Tongue Jack Assembly *	PCHA0130	1	1	-
37	Dolly Wheel / Skid Plate Assembly *	PCHA0131	1	-	-
38	End Cap, Tongue Jack	PCHA0135	1	1	1
39	Axle Assembly	PCHA0140	1	-	-
40	Wheel	PCHA0141	2	-	-
41	Axle Mount Kit	PCHA0142	1	-	-
42	Tire, 37 x 12.5 x 16 LRC Run-Flat	PCHA0143	2	-	-
43	Hand Brake	PCHA0150	2	-	-
44	Safety Chain Assembly (chain, hook & pin)	PCHA0160	2	1	-
45	D Ring	PCHA0161	4	-	-
46	Ground Stud Wing Nut	T270570	1	2	2
47	Fire Extinguisher	T295175	1	-	-
48	Wire Harness	PCHA0165	1	-	-
49	Tail Gate Pin with Lanyard	PCHA0170	2	1	-
50	Auxiliary Fuel Line Set	T295180	1	-	-
51	Funnel, Plastic	T295160	1	-	-
52	Exhaust Extension	T295070	-	-	-
53	Bumper, Urethane	PCHA0181	4	-	-

* Specify color (green, tan or white) by adding g, t or w as a suffix to the part number.

END OF WORK PACKAGE

WP R ---,-- -95151-00 Engine Parts List

Possible Spares for DRASH UST HP-4DL Trailer Engine					
Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
1	Main Bearing, Gear End	PENG5511	1	1	-
2	Camshaft Bushing	PENG5523	1	1	-
3	Gasket, Crankcase Door	PENG5594	1	1	-
4	Oil Pump	PENG5561	1	-	-
5	Oil Strainer	PENG5525	1	-	-
6	O-Ring, Oil Strainer	PENG5526	2	1	-
7	Oil Filter	T15504P	1	1	4
8	Oil Dipstick	PENG5564	1	1	-
9	Crankshaft	PENG5532	1	-	-
10	Center Bearing	PENG5512	3	3	-
11	Thrust Washer Kit	PENG5510	1	1	-
12	Main Bearing, Flywheel End	PENG5509	1	1	-
13	Oil Seal, Flywheel End	PENG5515	1	1	-
14	Air Filter Housing	PENG5583	1	-	-
15	Air Filter Element	T15501P	1	1	2
16	Piston Ring Set	PENG5507	4	4	-
17	Oversize 0.25mm Piston Ring Set	PENG5533	-	4	-
18	Connecting Rod Bolt	PENG5519	8	8	-
19	Connecting Rod Bearing (Big End)	PENG5513	4	4	-
20	Gear End Cover	PENG5567	1	-	-
21	Gasket, Gear End Cover	PENG5538	1	-	-
22	Oil Seal, Gear End	PENG5514	1	1	-
23	Dowel, Gear End Cover	PENG5539	1	-	-
24	Washer, Gear End Cover	PENG5540	7	-	-
25	Cylinder Head Assembly	PENG5565	1	-	-
26	Valve Guide	PENG5516	8	8	-
27	Inlet Valve	PENG5518	4	4	-
28	Exhaust Valve	PENG5517	4	4	-
29	Valve Spring	PENG5520	8	8	-
30	Valve Cotter	PENG5508	16	16	-
31	Hydraulic Tappet	PENG5522	8	8	-
32	Gasket, Cylinder Head	PENG5566	1	1	-
33	Fuel Lift Pump	PENG5568	1	1	-
34	Hose, Filter to Fuel Lift Pump	PENG5610	1	1	-
35	Hose, Fuel Lift Pump to Injector Pumps	PENG5611	1	1	-
36	Hose, Injectors to Return	PENG5612	1	1	-
37	Fuel Pump	PENG5542	4	4	-
38	Fuel Filter	T15505P	1	1	2
39	Fuel Injector Assembly (with Factory-Calibrated Nozzle)	T15506P	4	4	-
40	Injector Seal (Copper Washer)	PENG5552	4	4	-

Possible Spares for DRASH UST HP-4DL Trailer Engine

Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
41	Inlet Manifold	PENG5574	1	-	-
42	Gasket, Inlet Manifold	PENG5546	4	-	-
43	Exhaust Manifold	PENG5575	1	-	-
44	Gasket, Exhaust Manifold	PENG5548	4	-	-
45	Gasket, Manifolds	PENG5549	1	-	-
46	Water Pump Assembly	PENG5543	1	1	-
47	Gasket, Water Pump	PENG5544	1	1	-
48	Gasket, Water Pump Mounting Plate	PENG5570	1	-	-
49	Gasket, Thermostat Housing	PENG5571	1	1	-
50	Thermostat, Water Pump, 82 Degrees C	PENG5545	1	1	-
51	Exhaust Silencer	PENG5586	1	1	-
52	Gasket, Manifold Flange	PENG5599	1	-	-
53	Gear Ring	PENG5597	1	-	-
54	Flywheel Housing	PENG5582	1	-	-
55	Starter Motor	PENG5554	1	1	-
56	Contactor for Starter Motor	T230005	1	1	-
57	Radiator Assembly	PENG5588	1	1	-
58	Bottom Hose, Radiator	PENG5558	1	1	-
59	Top Hose, Radiator	PENG5559	1	1	-
60	Fan, Pusher	PENG5589	1	1	-
61	Alternator	PENG5555	1	1	-
62	Fan Belt	T15502P	1	1	1
63	Pulley, Alternator	PENG5600	1	-	-
64	Contactor for Heater Plug	T230005	1	-	-
65	Heater Plug	PENG5547	4	1	-
66	Magnetic Pickup	T255201	1	1	-
67	Actuator	T15516P	1	1	-
68	Controller	T255740	1	1	-
69	Overhaul Gasket Set	PENG5524	1	1	-

END OF WORK PACKAGE

WP R --- -- -95151-00

Generator Parts List

Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
1	Voltage Regulator	T10015P	1	1	-
2	Rectifier Assembly	T10008P	1	1	-
3	Bearing (ODE)	PGEN0105	1	1	-
4	Excitor Rotor	PGEN0106	1	-	-
5	Excitor Stator	PGEN0107	1	-	-
6	Diode	PGEN0108	3	-	-
7	Reverse Diode	PGEN0109	3	-	-
8	Fan (280 Die Cast)	PGEN0110	1	-	-
9	Bearing Carrier	PGEN0111	1	1	-
10	Carrier O-Ring	PGEN0112	1	1	-
11	Conduit Box	PGEN0114	1	-	-
12	Hub Spacer	PGEN0125	1	-	-
13	Drive Disc	PGEN0126	2	-	-
14	Adapter	PGEN0127	1	-	-
15	Linkboard	PGEN0118	1	-	-
16	Main Stator	PGEN0219	1	-	-
17	Main Rotor	PGEN0220	1	-	-
18	Shaft	PGEN0221	1	-	-
19	Mounting Base	PGEN0122	1	-	-
20	Main Rotor Assembly *	PGEN0223	1	-	-
21	Rectifier Hub	PGEN0124	1	-	-

* The Main Rotor Assembly consists of pre-assembled Main Rotor, Exciter Rotor, Shaft, Rectifier Hub, Fan and Bearing plus Rectifier Assembly.

END OF WORK PACKAGE

WP R ---,--- -95151-00

Environmental Control Unit Parts List

Item	Part Description	DHS P/N	Quantity		
			Ass'y	Depot	Field
1	Compressor for R-22	PECU12E01	1	-	-
2	Compressor for R-407-C	PECU12E02	-	-	-
3	Condenser Coil	PECU12E03	1	-	-
4	Condenser Fan	PECU12E04	1	-	-
5	Pillow Block Bearing, Condenser Fan	PECU12E05	2	2	-
6	Condenser Shaft	PECU12E06	1	-	-
7	Condenser Motor	PECU12E07	1	1	-
8	Condenser Motor Pulley	PECU12E08	1	-	-
9	Condenser Fan Pulley	PECU12E45	1	1	-
10	Condenser Belt	T10042P	1	1	1
11	Hot Gas Bypass Valve	PECU12E10	1	-	-
12	Solenoid Valve	PECU12E51	1	1	-
13	Sight Glass	PECU12E13	1	1	-
14	Filter Drier	PECU12E14	1	-	-
15	Evaporator Coil	PECU12E16	1	1	-
16	Evaporator Fan	PECU12E17	1	-	-
17	Evaporator Fan Bearing	PECU12E47	1	-	-
18	Evaporator Motor	PECU12E18	1	-	-
19	Evaporator Motor Pulley	PECU12E19	1	1	-
20	Evaporator Fan Pulley	PECU12E46	1	-	-
21	Evaporator Belt	T10043P	1	1	-
22	Expansion Valve	PECU12E21	1	1	1
23	Heater Element Assembly	PECU12E22	1	1	-
24	Compressor Contactor	PECU12E23A	3	1	-
25	Phase Sequence Relay	PECU12E24	1	1	-
26	Octal, P-S Relay Base	PECU12E25	1	-	-
27	Condenser Motor Contactor	PECU12E23B	1	-	-
28	Evaporator Motor Contactor	PECU12E23B	1	1	-

Item	Part	DHS	Quantity		
	Description	P/N	Ass'y	Depot	Field
29	Heater Contactor	PECU12E23A	1	0	-
30	Control Circuit Breaker	PECU12E26	1	1	-
31	Heater High Temperature Cutout Switch	PECU12E27	1	-	-
32	Time Delay Relay	PECU12E28	1	-	-
33	Selector Switch	PECU12E30	3	2	-
34	Thermostat	PECU12E31	1	-	-
35	High Pressure Switch	PECU12E32	1	-	-
36	Low Pressure Switch	PECU12E33	1	1	-
37	Vibration Absorber	PECU12E34	1	1	-
38	Vibration Absorber	PECU12E35	1	1	-
39	Quench Valve	PECU12E36	1	-	-
40	Fresh Air Filter	PECU12E37	1	-	-
41	Return Air Filter	PECU12E38	1	-	-
42	Bulb	PECU12E48	1	-	-
43	Access Charging Valve Cap	PECU12E49	2	1	-
44	Thermal Switch, Condenser Fan	PECU12E50	2	1	1
45	Rotary Switch Knob	PECU12E40	1	-	-

END OF WORK PACKAGE

WP R --- -- -95151-00 Electrical System Spare Parts List

The electrical set described below is supplied as standard equipment with this trailer.

Trailer Electrical Set P/N T295231 for DRASH UST Trailer with 35kW, 60Hz, Genset			
Item	Description	P/N	Quantity
1	Trailer Lead, 30', 120V, 20A	T295101	2
2	Trailer Lead, 50', 120V/208V, 60A	T295104	1
3	Shore Power Cord, 5', 100A, Open One End	T295107	1
4	Battery Charger Cable	T295111	1
5	Ground Rod Wire, 15'	T295145	1
6	Canvas Bag	09990	1

END OF WORK PACKAGE**WP R --- -- -95151-00 Field Kit for HP4-DL Trailer System**

The UST Trailer Field Kit is available as an accessory. DHS recommends having one of these kits on each trailer. Parts for these kits should be replenished as needed. The filters and belts provided in the kit are used in periodic maintenance for one UST Trailer for 1000 hours, or approximately one year, of operation.

Field Kit for DRASH UST HP-4DL Trailer			
Item	Part Description	DHS P/N	Quantity
1	Engine Air Filter	T15501P	2
2	Engine Fan Belt	T15502P	1
3	Engine Fuel Filter	T15503P	2
4	Engine Oil Filter	T15504P	4
5	24V Contactor for Starter Motor or Heater Plug	T230005	1
6	4A Fuse	T10024P	5
7	28V LED Light Bulb	T10025P	1
8	110V LED Light Bulb	T10026P	2
9	ECU Condenser Belt	T10029P	1
10	ECU Evaporator Belt	T10030P	1
11	Military Tail Light	T20001C	1
12	Red Reflector ²	T20020C	1
13	Amber Reflector ²	T20021C	1
14	Gear Assembly Repair Kit for Tongue Jack	T20023C	1
15	Assembly / Extension Pin for Tongue Jack	T20024C	1
16	Strap Wrench	T10040P	1
17	Canvas Bag	09990	1

Note 1: The ECU Fine Air Filter is packaged separately from the Canvas Bag.

Note 2: Specify color (green, tan or white) by adding g, t or w as a suffix to the part number.

END OF WORK PACKAGE

Section 7

7. TRAILER DRAWINGS 7-1

WP O --- , -- -95151-00 HP-4 DL System Loading Diagram 7-6

END OF WORK PACKAGE 7-6

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7. TRAILER DRAWINGS

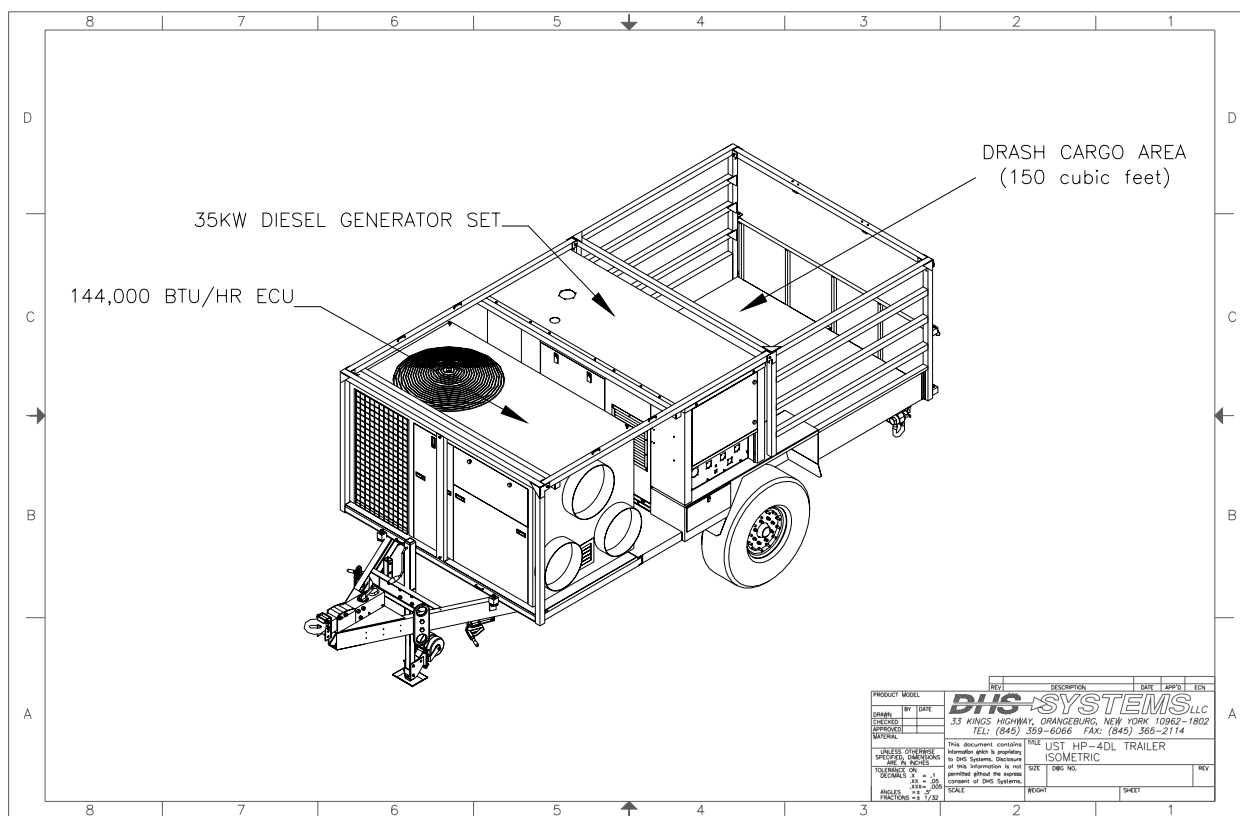


Figure 7-1 - Trailer Isometric View

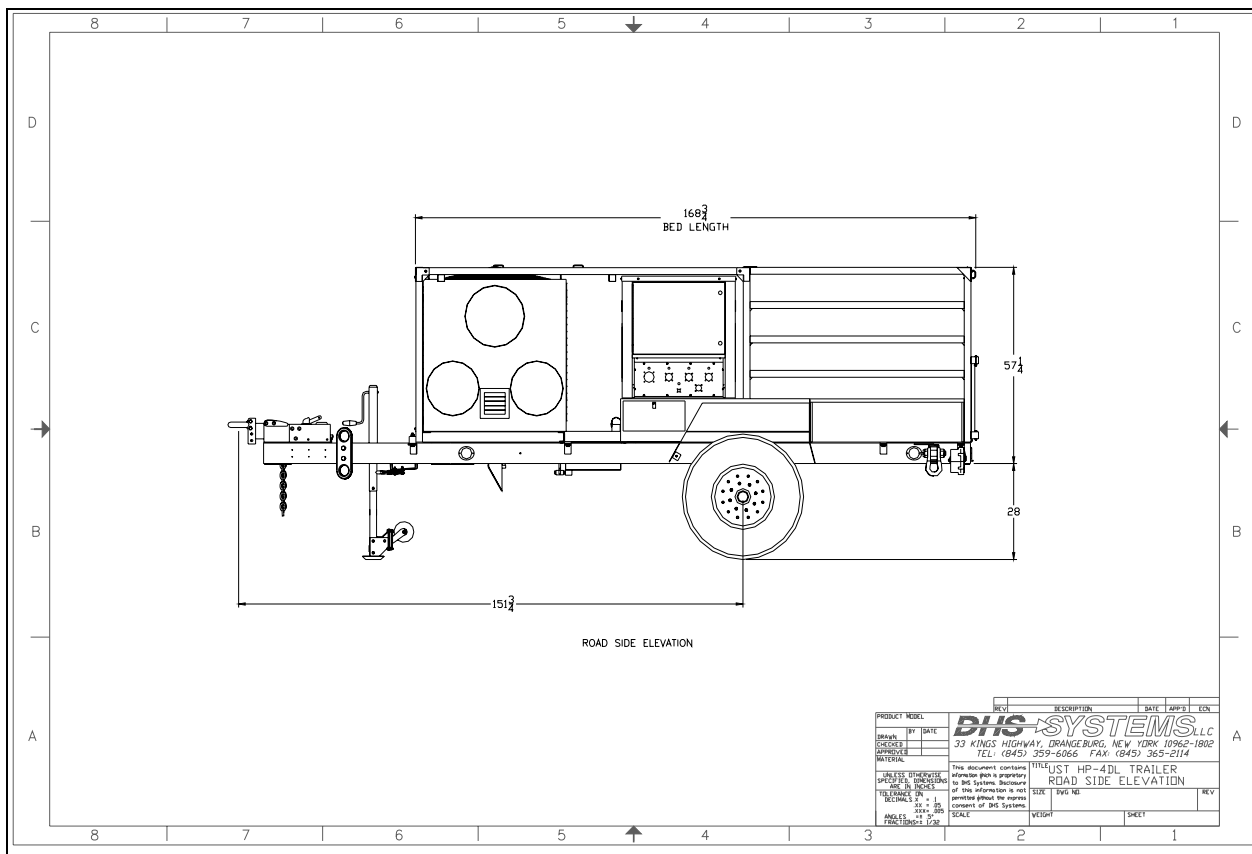


Figure 7-2 - Road Side Elevation View

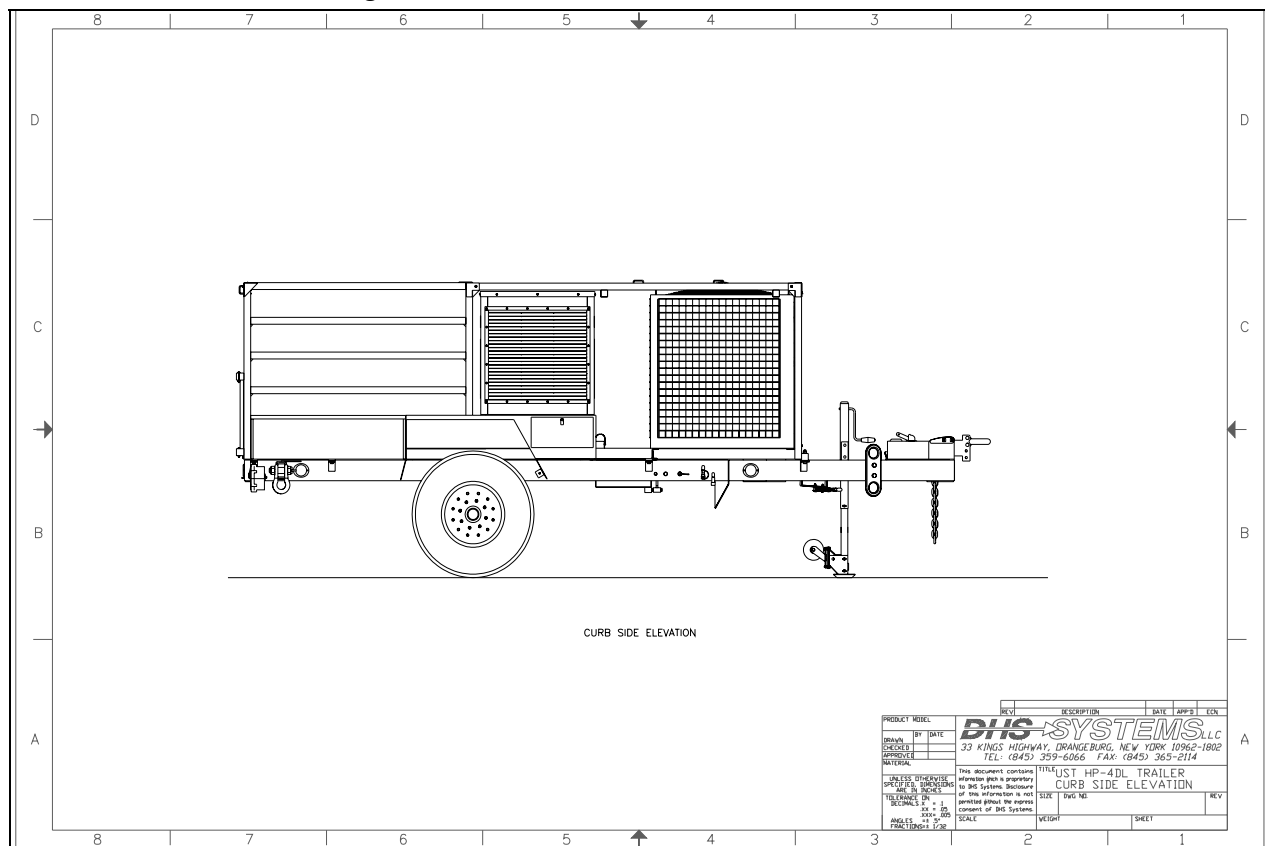


Figure 7-3 - Curb Side Elevation View

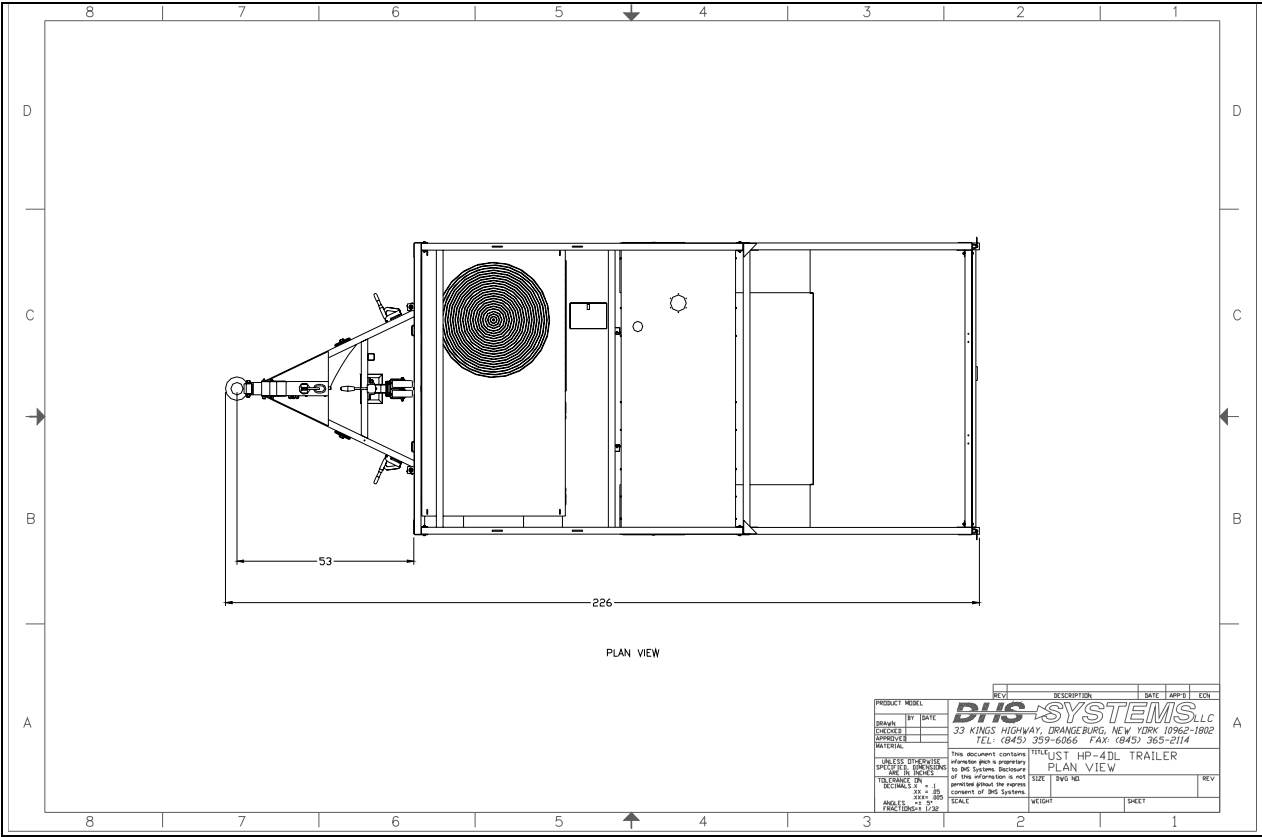


Figure 7-4 - Plan View

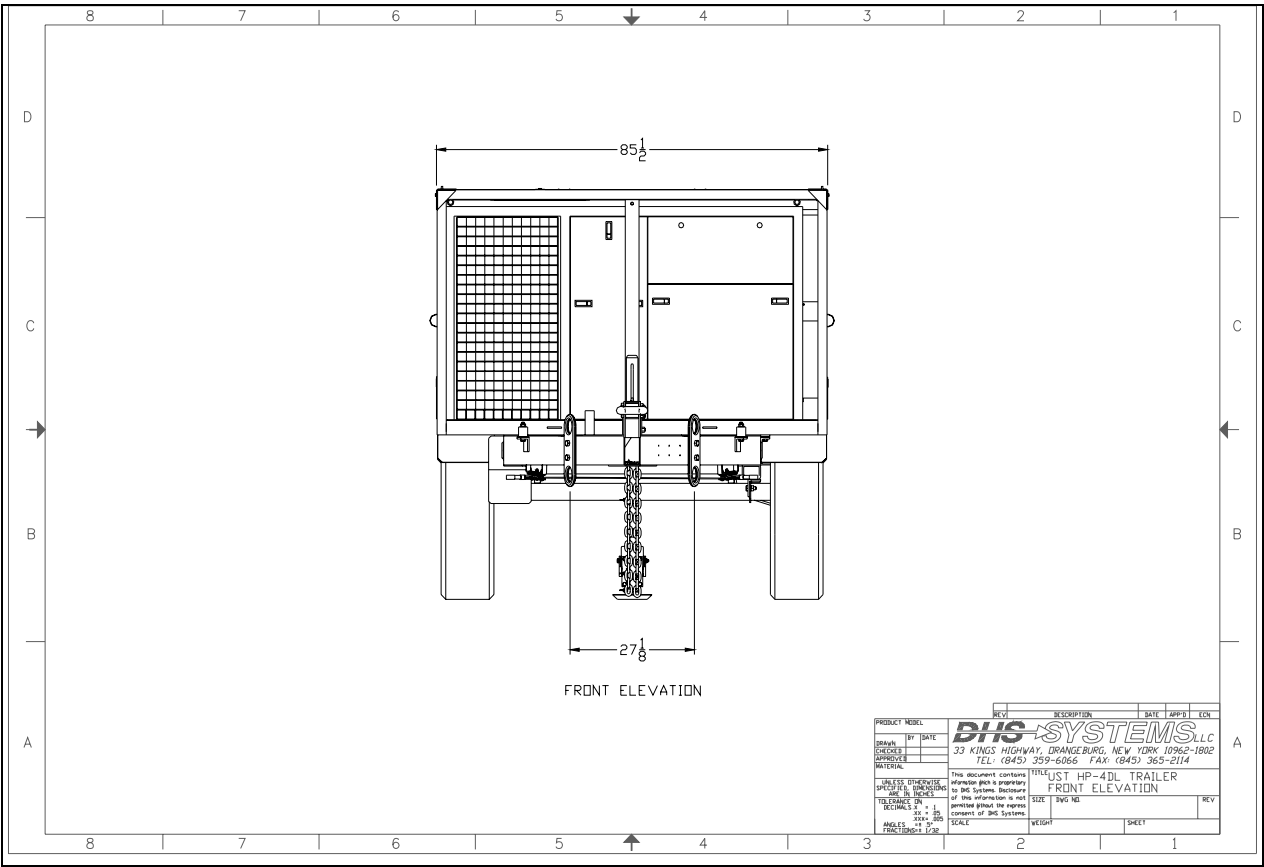


Figure 7-5 - Front View

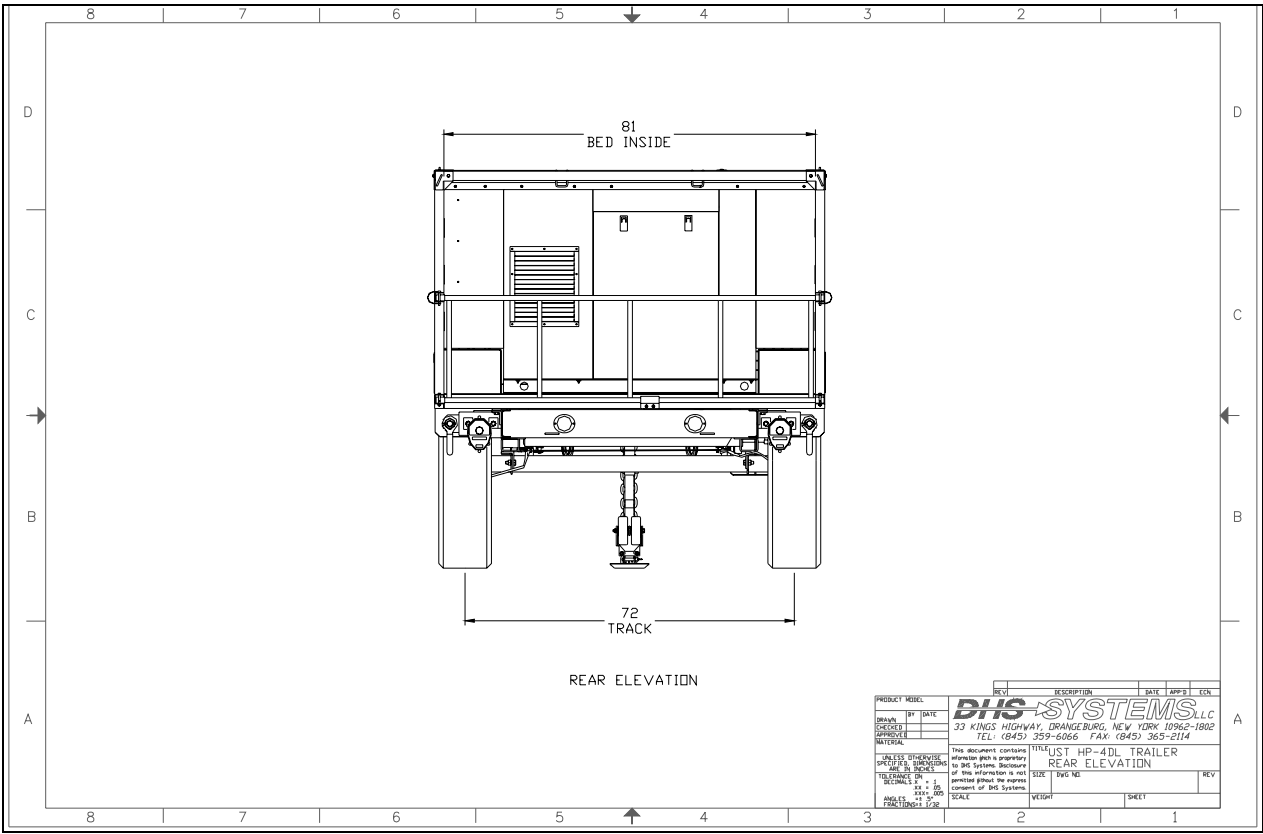
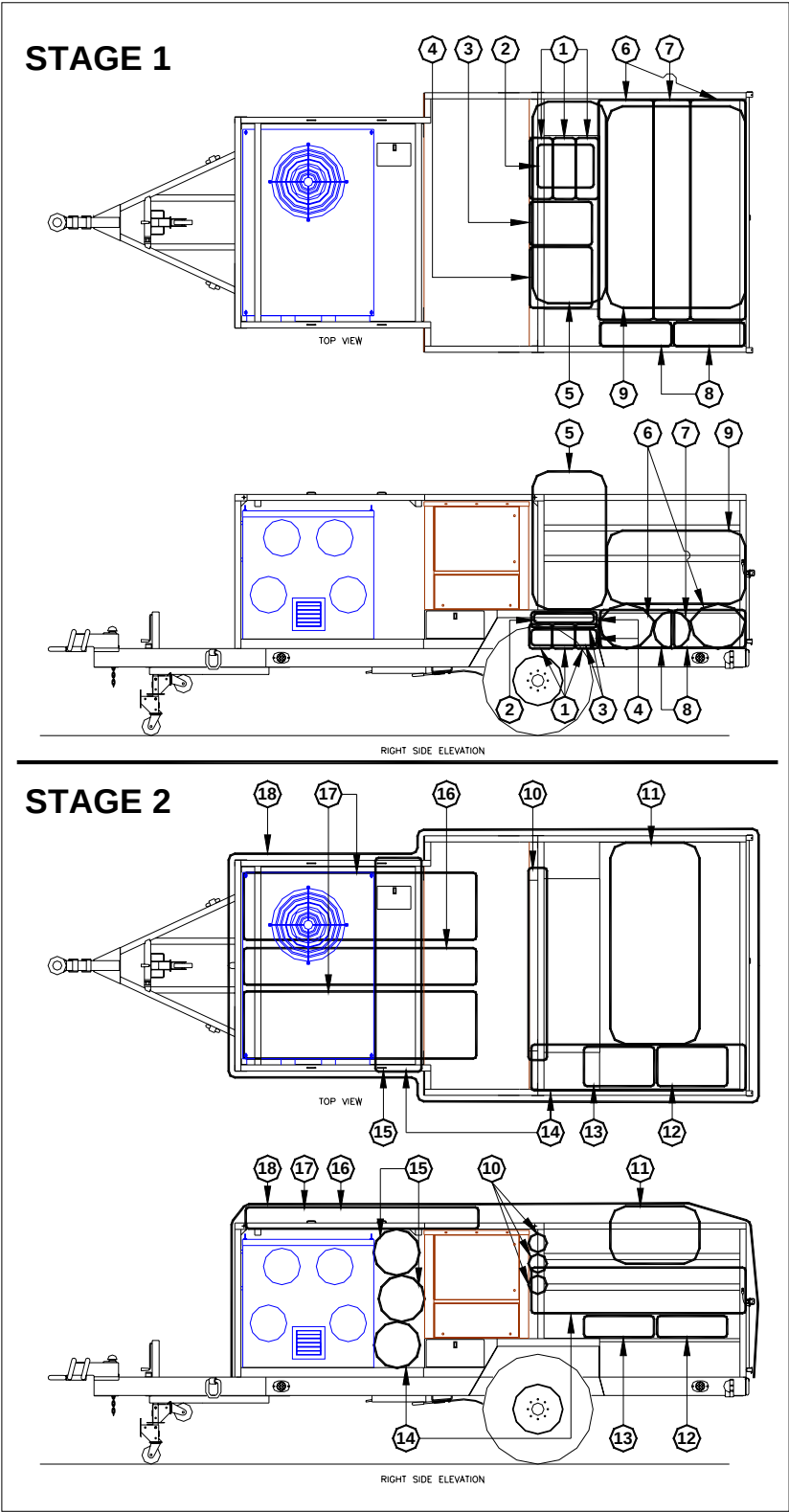


Figure 7-6 - Rear View

WP O --- , -- -95151-00 HP4-DL System Loading Diagram



DRASH SYSTEM 2 SUGGESTED LOADING DIAGRAM		
LOADING ORDER	DESCRIPTION (BAG CONTENT)	BAGS/ SYSTEM
S T A G E 1	1. 25 STEEL STAKES W/MALLET	3
	2. WINDOW SET (SMALL MODEL)	1
	3. WINDOW SET (LARGE MODEL)	2
	4. 1 CONNECTOR SET	2
	5. 1 SHELTER (LARGE MODEL)	1
	6. 1 SUB-FLOOR (LARGE MODEL)	2
	7. 1 SUB-FLOOR (SMALL MODEL)	1
	8. 5 PRIVACY CURTAINS	2
	9. 1 SHELTER (LARGE MODEL)	1
S T A G E 2	10. 1 SPARE PART KIT	3
	11. 1 SHELTER (SMALL MODEL)	1
	12. 1 VESTIBULE CURTAINS	3
	13. 1 WIRING SET	1
	14. 1 SUPPLY DUCT + SYS PLENUM	2
	15. 1 RETURN DUCT	2
	16. 2 BULB LIGHT CASE	(1)
	17. 4 BULB LIGHT CASE	(2)
	18. 1 TRAILER COVER	(1)
TOTAL BAGS PER SYSTEM:		27

Figure 7-7 - HP4-DL Loading Diagram

END OF WORK PACKAGE

Section 8

8. **WARRANTY..... 8-1**

 8.1 Warranty 8-1

 8.2 Warranty Registration Form.....8-2

 8.3 Equipment and/or Documentation Feedback Form 8-3

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DHS SYSTEMS LLC LIMITED WARRANTY

DHS Systems LLC warrants that all DRASH[®] (Deployable Rapid Assembly Shelter) products purchased hereunder will be free from defects in materials and workmanship. This warranty shall extend to the ultimate user as well as original equipment purchasers and shall be valid for the elapsed time beginning with the date of shipment according to the following schedule:

WARRANTY SCHEDULE

DRASH Shelters and Shelter Accessories: 60 Months

DRASH UST Trailers and Trailer Accessories: 12 Months

DRASH Heaters and Heater Accessories: 12 Months

DRASH Power Distribution Unit (PDU): 12 Months

The liability of DHS Systems LLC under this warranty is limited to the repair or replacement of any defective part or component due to a material defect or substandard workmanship. Damage due to excessive wear and tear, improper use or carelessness is not covered under this limited warranty.

Furthermore, it should be understood that this warranty does not constitute a guarantee that the products under warranty identified in the Schedule above will function without following instructions, including reading of the Operators Manual, and following proper maintenance procedures as well as using reasonable care for the periods stated in the above Schedule. On-site repair without prior discussion and approval from DHS Systems may void the warranty.

Warranty claims must contain a detailed explanation of the defect and be supported by summary extracts of pertinent service and maintenance records if applicable. DHS Systems LLC shall have the right to examine the alleged defect and may require the claimant, at the claimant's expense, to return the product for such an examination. If DHS Systems' personnel are required to visit the claimant's site to confirm any alleged defect, all expenses for travel and accommodations may be charged to the claimant.

Any warranty claims must be filed with DHS Systems LLC within 90 days after the alleged defect has been identified. All claims must be mailed or faxed to the following:

DHS SYSTEMS LLC
33 Kings Highway
Orangeburg, NY 10962-1802
Attn: Customer Service, Dept. C
Phone: 845-359-6066 Fax: 845-365-2114 email: drash@drash.com

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8. WARRANTY

8.1 Warranty Registration Form

The product warranty is included with the shipping of your product(s). Additional copies of this manual on CD-ROM may be purchased for the price of \$25.00. Please contact us for further information.

DHS SYSTEMS LLC
33 Kings Highway
Orangeburg, NY 10962-1802
Attn: Customer Service, Dept. C

Phone: 845-359-6066 Fax: 845-365-2114 email: drash@drash.com

To validate the Limited Warranty, you must register the equipment with DHS SYSTEMS LLC. Please fill in the information bellow, make a copy and mail to the above address or fax to (845) 365-2114. If you have multiple units you may list their VIN#, SSN# and HSN# below.

Warranty Registration

Date:	Primary POC	Rank:
Company/Unit Name:	Secondary POC	Rank:
Address:	VIN# (Vehicle Identification Number)	
Address:	SSN# (Shelter Serial Number)	
City	State:	Zip Code:
Country:		DHS use only
Phone:	Fax:	
Email:		

[illegible]

(fold)

Return Address:

Place
Stamp
Here

DHS Logistics
33 Kings Highway
Orangeburg, NY 10962

(fold)

8.2 Equipment and/or Documentation Feedback Form

RECOMMENDED CHANGE(S) TO OPERATIONS & MAINTENANCE MANUAL

FROM: (PRINT YOUR UNIT'S CORRECT ADDRESS)				DATE SUBMITTED:	
PUBLICATION TITLE OPERATIONS AND MAINTENANCE MANUAL FOR THE UST HP-4 DL TRAILER SYSTEM				PUBLICATION DATE March 17, 2004	
UST Trailer System HP 4 DL P/N: 80528			MANUAL P/N: T2-95151-00		
BE EXACT PIN-POINT WHERE IT IS				USE THIS SPACE DESCRIBE TO WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:	
PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO		
PRINTED NAME, GRADE OR TITLE, PHONE NUMBER, AND EMAIL ADDRESS				SIGN HERE	

(fold)

Return Address:

Place
Stamp
Here

DHS Logistics
33 Kings Highway
Orangeburg, NY 10962

(fold)